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THE
LARYNGOSCOPE.

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ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

THE ETIOLOGY AND THE ETIOLOGICAL TREATMENT OF "PLAUT VINCENT'S ANGINA".

DR. P. MANGABEIRA-ALBERNAZ, Campinas, Brazil.

Plaut Vincent's angina is by no means a separate disease as it has heretofore been considered. It is nothing but the pharyngeal localization, usually in the tonsils, of fusospirochetosis, a disease caused by the association of the fusiform bacillus of Le Dantéc with a spirochete, generally designated by Vincent's spirocheta.

Although Plaut Vincent's fusospirocheta hypothesis dates back to 1894-96, it is, however, true that up to the present the specifically morbid character of the symbiosis has been called in question, or denied. Since I propose to study the etiological therapeutics of this affection in its pharyngeal localization, I must pass to a sketch of its etiology.

Ever since the beginning of research to determine the causal factor of ulceromembranous angina, disagreement amongst authorities has been evident with regard to which of the two germs is to be considered the primary agent. While Plaut, in 1894, went no further than to regard the affection as produced by the fusospirochete symbiosis without expressing himself as to which of the two organisms played the principal role in this morbid condition, Vincent, as far back as 1896, was looking upon the spirochete as a simple saprophyte, attributing the whole of the pathological action to the fusiform bacil-

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lus. Several authorities opposed the point of view of Vincent. Among them was Letulle, and within a short while a strong reaction had set in against assigning this effect to the fusiform bacillus. Down almost to our own day, Braden Kyle, Bezançon, Besson and others still asserted in their works that the fusiform bacillus is the causal agent of angina. Since 1905, Ellermann, and shortly afterwards, Kurt-Bludhorn, declared that the spirochete was the causal factor of Plaut Vincent's angina, and this hypothesis was fully verified two years later by his demonstration of the brilliantly satisfactory curative effect of arsenobenzol upon the disease. Reasoning from this therapeutical effect most authorities concluded that the spirochete was the primary agent in the disease, and this is still the universally accepted conclusion.

In fact, at first sight it would seem that to prove certain substances, whose antiseptic action is specifically exerted upon spirochetes, curative of a diseased condition in which these are factors, is tantamount to proving the spirochetes to be the cause of the disease. This reasoning is, however, worthless and will not stand the slightest criticism. Let us admit, for example, that the cause of a given affection lies in the combination of two different germs. Let us grant further that neither of these germs alone is capable of producing any sort of lesion, and that only the two in combination can bring about a morbid condition. Again, let us suppose that we have chemical substances of specific selective action upon one of the two components, while we have none as certainly active upon the other. If we treat a patient with the latter, nothing will happen, for the action of the remedy is not specific upon the germ; if, however, we employe the former substances, exclusively active upon the first-mentioned component, we obtain a cure. What are we to infer? That the micro-organism is the cause of the disease? Certainly not. If one of the factors disappears, there is no longer any symbiosis, the other germ alone is inactive, a cure must result.

This reasoning, not only logical, but true—upon which I have had occasion to express myself since as far back at 1923—has been fully confirmed by the experiments of Kritchewski and Séguin, published in 1925. I shall treat of them shortly. The theory of the spirochete origin of angina, as of the other forms of the disease, was strongly reinforced by the researches upon the pathological anatomy of the lesions. Vincent's studies of nosocomial gangrene, Le Blaye's on experimental mercurial stomatitis, Tunicliff's, de Seguin's, Bouchet's and Logeais' on Plaut Vincent's angina; Azoulays' on bismuth stomatitis, Keisselitz' and Meyer's on tropical ulcer, Kritchewski's and

Séguin's on certain cases of pyorrhea, of noma, and of Plaut Vincent's angina, both acute and chronic, have demonstrated that the pathological anatomical lesions of all these supposed affections are analogous. The authorities cited have verified in all these cases, so far as concerns the micro-organic field, that there are two layers in the lesions: one a zone of necrosis, the other of inflammatory reaction. The *necrosis zone* includes three layers: *1.* Superficial, consisting of various microbe forms; *2.* Median, consisting of true necrosis, pre-empted exclusively by the germs of the symbiosis; *3.* Innermost, actively productive of bacilli *(Vincent's layer of active of bacterial production)* characterized by the presence of fusiform bacilli in considerable numbers, and of occasional spirochetes. The zone of inflammatory reaction has no fusiform, and no pus-producing germs, but, as Veszpremi had already discovered, it bears great quantities of spirochetes. The spirochetes are found throughout almost the whole thickness of this zone, or layer. They abound around the vessels and the small centres of interstitial hemorrhage, where they constitute a veritable tangle and, as it were, open the way for the latter.

It seems, therefore, that the spirochete is the causal agent of the affection. The experiments of Kritschewski and Séguin prove that this theory is not supported by the facts.

Kritschewski and Séguin in these studies made use of pure combined cultures. In one of the experiments they combined pure cultures of fusiform bacillus, strepto viridis and staphylococcus, and injected 4 c.c.m. of the mixture into a guinea pig, obtaining, however, purely negative results. A pus *spirochete dentium* culture several weeks old proved innocuous to the laboratory animals. Another culture of the same germ associated with a certain streptococcus culture, upon subcutaneous injection into the guina pig, caused a small abscess. A cubic centimetre of *spirochete dentium,* a dose which had proven innocuous when mixed with an equal amount of fusiform culture, and alone incapable of producing morbid conditions, upon subcutaneous injection, caused the development, after 12 days, of a putrid abscess of the size of a nut.

Taking a culture of *spirocheta tenuis* associated with a streptococcus and an unidentified anerobic bacillus, a mixture in itself inactive, they were able to re-energize it and render it pathogenic by the addition of fusiform bacilli. They finally obtained a mixed culture of *spirocheta acuta* and fusiform bacilli by cultivating the two germs in broth-ascites-kidney of rabbit, a culture which is pathogenic to the guinea pig, producing in it upon injection, lesions identical

with those brought about by inoculation with secretions of the gums.

From what has been said we conclude: *1.* That the fusospirochete combination is the cause of ulceromembranous angina. *2.* That the morbid character of the affection is not due to the spirochete alone, although the study of the pathological anatomy and of the therapeutics of the disease would lead one so to suppose. *3.* That the disease is produced by the two germs, neither alone being pathogenic.

The fusiform bacillus of Le Dantéc, Seitz' *bacillus hastilis,* is a well defined germ bacteriologically. Although Klarenbeck asserted that the difference between it and Van Bang's necrosis bacillus is not clearly enough marked, the presence in it of bodies of volutine (proteic nuclei equivalent to the metachromatic granulations of the bacillus of diphtheria), when it is colored with Giemsa's solution, and their absence in the other germ, are significant facts.

The spirochete is not, however, so readily classified from the microbiological point of view. I do not think this the occasion for going into this problem in detail. In my opinion we should conclude from the most recent and complete studies of the spirochetes: *1.* It is not possible to say accurately how many types of spirochetes there are in the mouth; *2.* Whether the species be one or more, it seems that those found in the mouth are identical with those found in other cavities in the outer skin, all of them derived from the soil; *3.* From the morphological point of view, it seems that the type found in symbiosis with the fusiform bacillus is always the same, wherever it be. Since we cannot classify the nonsanguinary spirochetes, we may call the one which enters into fusospirochete symbiosis *Vincent's spirocheta.*

Proper therapeutical procedure in Plaut Vincent's angina has not usually been observed. If, as we have seen, the fusospirochetosis is due to the joint action of the fusiform bacillus and Vincent's spirocheta; if, as the studies in pathological anatomy demonstrate, the spirochete penetrate deeply into the tissues; if, in order to reach it, it becomes necessary to dissolve the magma underlying the lesions, the pathognomonic symptom of the disease, then it is clear that the remedy to be used should fulfill very special conditions.

These conditions may be summarized in the following five requisites:

1. The remedy employed should be absorbed to a greater or lesser extent by the tissue; that is, it should penetrate in order that its action be felt upon the deeper tissues and on the surface.

2. It should be antiseptically active for an appreciable time. This means that the remedy should not be immediately resolved by contact

with the tissue, as happens, for example, with hydrogen peroxid, perborate of sodium, etc.

3. It should be neither caustic nor destructive. These qualities unfortunately are often and unwisely made use of in the treatment of disease. If, however, we destroy tissue, we increase and enrich the field for the multiplication of germs; for unless the cauterization be very extensive, the germs present, not only on the surface, but in the deep tissues, will not be reached. Such thorough caustic action is not always practical.

4. It should have a dissolvent action upon the necrotic tissue characteristic of the lesion.

5. Its antiseptic action should be specific upon one or other component of the symbiosis, for if one of these is eliminated the symbiosis is destroyed. The antiseptics directly acting upon anerobic bacilli (of which the fusiform bacillus is a variety) are the oxidizing agents, and their value has not been thoroughly proven on the living subject; for it is rare to find an anerobic germ which cannot live as erobic. The same is not the case with regard to the spirocheticidal agents, the antiseptic action of which is more specific than any other known in therapeutics.

If we study the therapeutics in vogue in the so-called ulcero-membranous angina, we shall see how far specialists have come from satisfying the above-mentioned conditions. This perhaps is the reason why Plaut Vincent's angina has called forth by itself a greater diversity in treatment than all other infections of the pharynx put together. It is evident that in mild cases "any antiseptic will do", as Escat says; but, unfortunately, the specialist does not always meet simple cases. Hence arose the practice of violent therapeutics with the salvarsan administered intravenously, a treatment which at the present, should only be resorted to in the most exceptional cases.

Returning to the critical examination of the different methods of treatment in vogue to cure Plaut Vincent's angina, let us see which meet the above specified conditions.

The following substances meet the first condition; that is, they penetrate more or less deeply:

a. Slight penetrating power; *1.* tincture of iodin in paints (Vincent); *2.* methylene blue, strong solutions (Lermoyez); *3.* trypaflavine (Erich Mayer, Mann, Kall, Markus Mayer); *4.* silver nitrate of methylene blue, or agrochrome (R. Fischer, Kronenberg); *5.* pyoctanine, or methyl-violet (Kronenberg, Wichels); *6.* mixture of trypaflavine with the gentian violet, or acriviolet (Herzig).

b. Still weaker penerating power; *1.* chromic acid (Dubreuilh); *2.* picric acid (Prill).

c. Strong penetrating power; *1.* salvarsan and neosalvarsan, employed generally or locally; *2.* the salts of bismuth locally applied.

Here we should give emphasis to the special effects of the bismuth salts. We learn from the Levaditi studies, just as Ehrlich verified with regard to atoxil, bismuth does not attack spirochetes except when in presence of hepatic tissue. Shortly afterwards Levaditi discovered that the substances necessary to render bismuth effective against spirochetes is to be found in other organic tissues. Furthermore, the power which the organism has of absorbing bismuth is such that poisoning frequently results in cases of ulcers, fistulas, etc., in which bismuth was locally employed. Its penetrating power is not equalled by any of the other substances used in the treatment of Plaut Vincent's angina.

a. Brief antiseptic action; *1.* carbolic acid; *2.* sulforicinolic phenol (Ruault); *3.* hydrogen peroxid at 3 per cent; *4.* potassium permanganate; *5.* tincture of iodin (Vincent); *6.* silver nitrate; *7.* chromic acid (Dubreuilh); *8.* trichloracetic acid (Gallagher, Veis); *9.* zinc chlorid (Rosenstein); *10.* sodium perborate (Hubbard); *11.* liquor potassii arsenitis or Fowler's; *12.* mercury bichlorid, 2/1000; *13.* tricresol, 5 per cent;)*14.* pure or diluted lysoform; *15.* powdered calcium chlorate (Grenet); *16.* camphorated menthol; *17.* a paste of garden pepper, *capsicum annum; 18-19.* the chlorates of sodium and of potassium (Bergeron, Moure, Grenet); *20.* iodoform; *21.* tanine; *22.* protargol; *23.* boric acid; *24.* ichtyol; *25.* sodium sozoiodolate; *26.* potassium sulfocyanid; *27.* cooling with ethyl chlorate (Jellinek); *28.* Pregl's solution (Glass); *29.* sulfate of copper, 10 per cent (King); *30.* emulsion of tartar emetic (Schmidel); *31.* picric acid (Prill); *32.* Lugol's solution; *33.* phenosayl; *34.* thymic acid; *35.* formol (Raoult); *36.* salicylic acid (Richardière).

b. More prolonged action; *1.* the coloring substances: methylene blue, fuchsine, gentian violet, methyl violet, trypaflavine, rivanol, gentian violet being the most active of these.

c. Most powerful action; *1.* the arsenobenzols, particularly neosalvarsan and silversalvarsan; *2.* salts of bismuth, of still greater power. Its action, as I was able to verify by its analgesic properties, which it also possesses, lasts from two to four hours after application.

The third condition—no caustic or destructive action—is met by all the substances previously studied, except acids and astringents.

Neosalvarsan is very painful when applied, but does not destroy tissue. Bismuth salts also bring about some burning, which is much more tolerable than that produced by neosalvarsan; neither are they destructive.

The fourth condition—a dissolving action on the necrotic layer—is met, I believe, only by bismuth. In tropical ulcer, the cutaneous localization of fusospirochetosis, I had occasion to employ 11 processes of treatment and bismuth alone presented this property of fusing the magma of the lesions. At the first treatment the bandage was thoroughly soaked, immense exudation had taken place, and the first washing had revealed the wrinkled floor of the ulcer.

The fifth requisite—the substance should have a relatively specific antiseptic action upon one of the compounds of the symbiosis—is not met except by few of the therapeutical agents. The following may be considered more or less specific for a fusiform bacillus, as also for the anerobic bacilli in general: *1.* hydrogen peroxid, 3 per cent, and perhydrol; *2.* powdered sodium perborate; *3.* potassium permanganate; *4.* chromic acid; *5.* chlorate of calcium.

One cannot, however, compare the antiseptic effect of such substances upon the fusiform bacilli with that of the arsenobenzols, and the bismuth substances upon Vincents' spirocheta. That this is true is clear from the fact that up to the present the majority of the authorities consider the best treatment of Plaut Vincent's angina to be the use of neosalvarsan. The only difference of opinion is with regard to the method of use; for, while some regard the effect of the local application superior to the intravenous (Coolidge, Hubbard, Laurens, etc.), others consider the intravenous as the more efficacious (Tanturri, Dubreuilh, Kiefer, etc.). In this particular I am of the opinion of Beck and Kerl: "that the intravenous application should be resorted to only in very severe cases, or in those which are frequently recurrent".

I do not wish to forget to mention some forms of treatment of Plaut Vincent's angina which failed to become general, in all probability because they were not practicable. Among them we have: the intravenous use of urotropin, 40 per cent (Sachs); injections of antidiphtheric serum (Neste); injections of Rosenbach's tuberculin (Stuhl); injections of modenol (Kronenberg); the use of colloidal arsenic (Capitan); the local use of *omeisan* (sodium boroformiate); intravenous injections of potassium antimony tartrate; local use of stovarsol (Couvy); of treparsol (Carriga); of *yatren;* of Loeffeler's solution (Cozzolino); extraction of the wisdom teeth (Puig), etc.

The arsenobenzols entered into the therapeutics of ulceromembranous angina in 1907. Though some authorities grant Gerber the first place in its use in 1910, it seems really to belong to Ehrlich, in 1907. Arsenobenzol was then employed intravenously and this method soon became general. It was not till 1911 that Achard and Flandrin, and 1912 that Caesar Hirsch thought of calling into play the aquous and glycerinated solutions, the pure substances, powdered, applied upon the lesions, which naturally displaced the dominant intravenous method. Up to date this is still the most common treatment, considered the most efficacious and recommended by almost all authorities.

Although various investigators have used bismuth and its salts in the treatment of syphilis, ever since 1889, we can safely say that bismuth did not become a standard remedy for the *lues* until after the notable studies of Sauton and Robert, of Sazerac and Levaditi.

Among the researches by which these authorities proved *in vivo* the action of potassium and sodium bismuth tartrate, are two experiments highly interesting to us.

The first relates to a rabbit with lesions of the foreskin showing abundant treponemas. A potassium and sodium bismuth tartrate salve, 30 per cent, was applied to the affected part, and the application was repeated on the following day. On the second day it was observed that the treponemas were scarce. On the third, they were no longer to be found. The lesion seemed to be cured, and during 42 days it was not possible to discover treponemas.

The second experiment relates to a rabbit in which identical lesions were observed, upon which the pure salt in powdered form was applied on two successive days. The treponemas disappeared on the second day, to reappear on the seventh.

The same investigators verified further that bismuth does not act *in vitro* against spirochetes. In a culture tube containing living spirochetes the presence of bismuth salts cause no change. However, if we add to this tube a small quantity of hepatic extract, the germs immediately die. Further studies prove that other parts of the body possess the same power as the hepatic tissue.

Previous studies by Sauton, cut short by so premature a death, proved that certain bismuth salts were highly antiseptic. For this reason it was that the bacillus of tuberculosis were rendered sterile upon the addition of these salts in the proportion of 1:150,000.

This antiseptic effect of the salts of bismuth has been proven with regard to other germs. Lemay and Jaloustre noticed that the staphylococcus is sensitive in liquid cultures, in soluble bismuth tartrate in

the proportion of 1:500,000, while the streptococcus and the bacillus coli are able to resist even 1:2,500.

Practice resulting from the wide use of bismuth salts in the treatment of syphilis served further to call attention to their remarkable healing property, which, by the way, Levaditi himself had surmised.

The employment of bismuth in local applications in ulceromembranous angina, and in all spirochete affections, pure or compound, was justified. Bearing in mind that its intramuscular application intensifies the multiplication of germs in the fusospirochete symbiosis, it is possible, as was and still is supposed by some, that the bismuth when employed as mentioned, brings about the cure of the effects of the fusospirochetosis. This is the reason why I began my experiments on Plaut Vincent's angina making careful paints with potassium acid bismuth tartrate at 10 per cent. About the same time Prof. F. Luz, of Bahia, was making experiments with potassium and sodium bismuth tartrate.

Without delay I published my preliminary note in the *Jornal dos Clinicos"*, of Dec. 15, 1922, and my final studies in the Archives Internationales de Laryngologie for October, 1924. These experiments were fully confirmed in the researches of Mlle. Le Goff. Taking my final studies as a basis, she tried out, in the Lemaitre Clinic in Paris, the action of bismuth on ulceromembranous angina, reaching results identical with mine, and these studies constitute her thesis for the doctorate. And still more recently, Casteran and Del Piano employed the bismuth therapy in the pharyngeal manifestations of the fusospirochete, and concluded that bismuth is the ideal treatment in these lesions.

Few of the bismuth salts have been employed in this treatment. The first used was acid potassium bismuth tartrate in oil emulsions at 10 per cent (the *bismuluol* of trade). Afterwards I use the potassium and sodium bismuth tartrate *(trepol)* in emulsions at 30 per cent. Le Goff tried the oxid of bismuth *(neotrepol)* at 3 per cent. The iodin bismuthate of quinin *(quinby* and *bismugalol)* has been tried, and recently Laurens employs with relatively poor results the subnitrate of bismuth. It seems that the effect of the salt is in direct ratio with the percentage of metallic bismuth. It is my opinion, however, that if the bismuth tartrate at 30 per cent causes overwhelming therapeutical results, it is not necessary to use larger doses of bismuth. The absorption of the metal by the ulcer is a recognized fact, and the poisoning of the organism—though so far unobserved—is quite possible.

I use daily paints of slight duration. Le Goff applied neotrepol at 3 per cent four times a day, leaving the patient to do the paints. This method does not seem reliable, and the amount of salt employed is indeed too large. This criticism is sound, for the results obtained by her are in no way superior to mine.

The treatment I employ consists in a daily paint of the ulcer with a salve emulsion of bismuth tartrate at 30 per cent; gargling with any mild antiseptic every two or every three hours. The severe cases call for three treatments at most. Le Goff carried on the treatment as long as eight days, but without continuous attendance on the patients. One should remember, as Beck and Kerl say, "that the affection lasts, when treated with the usual antiseptics, 14 to 21 days".

Bismuth should substitute neosalvarsan in the treatment of Plaut Vincent's angina. This seems a rather bold assertion, but the study of innumerable other localizations of spirochetosis upholds me in it. I employed bismuth with the best results in three cases of fusospirochete otitis; in 64 cases of phagedenic ulcer *(ulcus tropicum)*; in three phagedenic genital cases accompanied with widespread destruction of the foreskin and gland, and in two cases of erosive balanitis of Berdal and Bataille. Pedral Sampaio secured identical results in a case of Bergeron's stomatitis, and Celso Barroso likewise in a severe phagedenic genital case involving almost total destruction of the gland, and in another of "postpartum" vaginal gangrene. Some of these cases lack the support of laboratory tests (Celso Barroso's); but in the majority of the fusospirochete symbiosis was most positively present in the smears from the exudate of the lesions. One may say that this simply proves the positive effects of bismuth; but in some of the above cases (phagedenic ulcer), neosalvarsan applied locally and generally proved itself in several trials inferior to the bismuth. In one case the intravenous use of neosalvarsan had no effect on the lesion. In another case, two identical lesions treated locally, the one with this drug, the other with bismuth, healed at different times, bismuth proving to be unquestionably superior. Le Goff, in Observation No. 8 (observation of a physician upon himself), cites a case of fusospirochete angina, in which the clinical diagnosis was supported by the microscope, in which the use of paints with chlorate of zinc, at 10 per cent, methylene blue and pulverized neosalvarsan produced no results. Dilute *trepol* in three days brought about a cure.

The economic factor is also worthy of attention. The local neosalvarsan application is usually in solution at 3 per cent. Since this deteriorates on prolonged exposure to the air, it becomes necessary

to use fresh solutions. On an average of three applications, the treatment costs about $3.50, while the same results are obtained with 2 gm. of bismuth, or about 25 cents, at present exchange.

The local application of neosalvarsan is very painful; that of bismuth, as spoken of by some hypersensitive patients, is simply stinging, while for the majority it is painless.

The principal advantage which bismuth presents over neosalvarsan is, notwithstanding, its effect against pain. As is known, the principal characteristics of fusospirochetosis are: pain, false membranous ulcer and bad odor. Neosalvarsan is active against pain when the involutionary process is far advanced. I observed in all localized cases of spirochetosis that the pain disappears, not to return *two to four hours after the first application of bismuth.* This fact has been noticed by all who have employed the treatment, and Le Goff, amongst others, calls attention to it.

This sedative property of bismuth deserves to be more widely employed in our special department. I was able by the use of 20 per cent bismuth paints to allay for periods of four hours the most violent pains of a patient suffering from endothermic coagulation of the tonsils.

Summing up, we may say:

1. Plaut Vincent's angina is a pharyngeal localization of fusospirochetosis.

2. This disease is produced by the association of the fusiform bacillus of Le Dantéc with a spirocheta which may be called Vincent's, in default of an exact microbiological classification.

3. The etiological treatment of the disease calls for five conditions to be met by the remedy, which are strictly present in high degree in only two series of substances: the bismuth substances and the arsenobenzols.

4. Bismuth has many advantages over the latter: it is less toxic, more powerful, more economical, and is immediately and certainly sedative, allaying the characteristic pain.

5. The bismuthic substances locally employed are, therefore, the best treatment of Plaut Vincent's angina.

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TUMORS, BENIGN AND MALIGNANT, OF THE TONSIL AND PERITONSILLAR AREA.*

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Embryology and Anatomy: The tonsil develops as masses of lymphoid tissue about an evagination of the lateral wall of the pharynx. In the third month of intrauterine life the lateral pharyngeal wall pouches out to form a little fossa, which is situated between the second and third visceral arches, the fossa being lined with stratified squamous epithelium continuous with that of the pharyngeal cavity. Little solid epithelial buds proceed from this diverticulum into the surrounding connective tissue, the buds subsequently becoming hollowed out. Wandering leukocytes from the neighboring blood vessels infiltrate the connective tissue around the young crypts and these cells, becoming aggregated into condensed and isolated groups, give rise to the lymphoid follicles peculiar to the tonsil. The separate and well differentiated condition of the follicles is not attained until some months after birth.

The place of origin of the tonsil between the second and third visceral arches explains the position of the adult organ between the anterior and posterior palatine arches, since the latter structures represent the deep extremities of the former (Heisler).

Tonsils therefore are composed of lymphoid cells collected into groups called follicles and separated from one another by areas of connective tissue. The surface of the tonsil is generally irregular, being identified with crypts or lacunae or with sulci. Into them open muciparous glands, which are situated into stroma of the tonsil below the level of the follicles. The tonsil is covered with epithelial cells and its covering varies with the situation. Thus, the palatine and lingual tonsils are covered with flat epithelium.

Pathology: After we have considered the embryology and anatomy of the tonsils, we shall go into the pathology to which the tonsils may fall heir. Most writers on the subject of tonsillar and peritonsillar tumors agree, that primary malignant neoplasms in this region are rather uncommon. The first recorded case seems to be that of Baile and Cayol, of Paris, which appeared in 1912. These authors differentiated the scirrhous or indurated type from the soft, ulcerated form.

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Since their observation, the names of Lambert, Neuman, Hess, Delavan and others have been associated with tonsillar malignancy. Literature, however, has been largely limited to isolated case reports, with the exception of a comprehensive review of the subject by Matthews and Mayo Clinics, in 1912, and a review of the methods of treatment by Quick, in 1922. Guthrie, in 1918, found only 77 cases of sarcoma of the tonsil recorded. To this he added three cases of his own. In 1924, Leon H. Smith presented a clinical study of 40 cases of epithelioma of the tonsil and adjacent structures, treated at the State Institution for the Study and Treatment of Malignant Diseases, at Buffalo, New York. At the Skillern Clinic of the Post-Graduate School of the University of Pennsylvania, during the past seven years we have seen two cases of malignancy of the tonsil, one case being carcinoma in an adult and the other case was lympho-sarcoma of the right tonsil in a child, age 5½ years. The first case was diagnosed by biopsy. The second case was diagnosed without a biopsy.

The literature on malignancy of the tonsil is somewhat scattered, owing to the fact that these lesions have generally been placed under the classification of tumors of the oral cavity and throat. It has, therefore, seemed to the essayist that a brief compilation of our knowledge of this subject would be of interest.

Tumors of the tonsil and peritonsillar region, whether benign or malignant, possess the same histologic characteristics as do similar growths in other parts of the body. Not only is the histologic characteristic the same, but the psychologic effect, as well as the local pressure effect and sense of obstruction, are the same. The patient, once cognizant of the fact that a new growth is taking place in his throat, whether a positive diagnosis has been made or not, immediately loses courage and takes a downward trend.

Of the benign tumors met with in the throat, according to A. Logan Turner, papillomata are the most frequent. The recognition of such tumors is very simple, because of their light pinkish color, and at times present a raspberry-like appearance. They may be sessile or pedunculated. The sessile tumors are the most serious form of the papillomata variety. The pedunculated, however, are the most favorable form and the most promising to the patient. A few scattered cases of adenomata, fibromata, chondromata, angiomata, dermoid cysts and osteomata have been reported. In the Skillern Clinic, we have seen angiomata and condromata, though other forms, such as dermoid cysts and osteomata, we have not as yet seen. In 1925, we saw a case of parotid gland occupying the left tonsillar fossa. Dr.

Ross Hall Skillern, when operating on the case, immediately diagnosed it as one of nontonsillar tissue, though the external appearance of the mass was that of tonsil. A microscopic examination revealed salivary gland tissue. The examination of the section was made by Dr. Case, of the Post-Graduate School of the University of Pennsylvania.

An interesting case of pedunculated tumor of the tonsil is that described by F. Pearce Sturm. The patient was a girl, age 11 years, whose palatal and pharyngeal tonsils were enucleated in the course of routine work at the Ear, Nose and Throat Clinic at Leigh, England. A pedunculated growth having the size and naked eye appearance of a red currant hung over the plica triangularis from the lower pole of the left tonsil. The tumor measured 13x5x4 m.m., and was attached by a pedicle 4 m.m. in length and 2 m.m. in diameter. Microscopically, the tumor was a fibroadenoma. The angiectasis, which was such a prominent feature, was probably due to intermittent torsion of the pedicle.

A unique case of osteomata has recently been reported by S. G. Shattock, who gives an extensive review of the literature of osseous and cartilaginous formations in the tonsil. The patient, a woman, age 30 years, had a swelling in the region of the left tonsil, which had been present as long as she could remember. The condition caused pain, because of the tongue rubbing against exposed bone. The patient had consulted a throat specialist at the age of 8 years, and he had advised that the tumor be left alone. The mass had continued to grow until it had reached the size of a walnut, 3 c.m. in its longest diameter. The tumor was easily shelled out of its bed, and proved to be an osteoma.

It is well known that cartilage occurs in the tonsil; it has been found in one-third or more of the cases examined. This cartilage, in the majority of cases, originates from the embryonic rests of the bronchial arches. There is reason to suppose that a chondro- and osteoplastic predisposition on the part of certain connective tissue cells arising from the bronchial tissue responds quite readily to inflammation, and this may account for the condition in some cases. While embryonic cartilage is rarely the starting point of neoplasms, chondromata and fibrochondromata probably originate in these cartilaginous islands in the tonsil.

The symptoms produced by simple benign tumors are generally those due to mechanical interference, and the diagnosis is readily made by inspection.

The treatment is simple removal, following the technique ordinarily employed in tonsillectomy. Papillomata can be removed with the

scissors or, if sessile, they may be destroyed by means of the cautery. A. Logan Turner thinks it unnecessary to remove such growths unless they are causing symptoms or are a source of irritation.

Malignant Tumors: Malignant disease in the tonsil or surrounding tissue is nearly always primary. The varieties of neoplastic disease met with are known as sarcoma, lymphosarcoma, epithelioma, scirrhous carcinoma and adenosarcoma. As is the case in regard to these types of malignancy in other locations, carcinoma is rarely found before the age of 40 years, while sarcomatous growths may be encountered at any age.

Sarcoma may be of the round, small or large spindle cell type. It tends to grow rapidly; when it has attained a considerable size the mucous membrane covering it appears bright red and succulent. It is not so hard, and remains for a time limited to the capsule of the tonsil. However, this limitation is more apparent than real and in a short period of time the growth passes the barrier and infiltrates the deeper structures, frequently involving the region behind the jaw and causing large swellings in the neck. Beck points out that in the study of this type of growth, it is important to note whether the blood lakes are excessive or not. The most significant feature in the histological picture is the amount of fibrous tissue present, as this usually denotes the degree of malignancy. The more fibrous tissue there is, the less malignant, and the less the probability of recurrence after removal. Metastasis is through the bloodstream.

In young persons, lymphosarcoma is the most common neoplasm encountered. It assumes many typical forms, and hence in the literature we find many varieties of sarcoma occurring in the tonsil. They all belong to the general classification of lymphosarcoma if the histological reports are carefully studied (Quick). This type of growth tends to ulcerate early and to spread superficially. In the case which occurred in the Skillern Clinic no ulceration took place.

Carcinoma in its early stages presents a hard, uneven surface, surrounded by an ear of induration which tends to ulcerate early; the ulceration spreads both in depth and laterally, and mucopus covers the ulcer. In touching this type of growth with a probe, it is likely to bleed easily and is very painful. The glands of the neck become involved early, before ulceration occurs. With this type of growth there is a peculiar cachexia.

The scirrhous variety of carcinoma, which, according to Coakley, is quite common in this region, grows much more slowly and is accompanied by pain and slight, but progressive, enlargement of the cervical lymphatic glands, ulceration occurring very late.

Other types of tonsillar and peritonsillar tumors are syphilitic gumma and tuberculous lesions. Their differentiation from other growths will be considered in connection with the differential diagnosis of the various types of malignancy.

Etiology: The various factors that tend to produce malignant disease in the tonsillar and peritonsillar region are not definitely known. They have been variously ascribed to smoking and irritation due to other causes. It is, however, a fact that the majority of individuals in whom these growths have been found have been excessive smokers. The author, however, doubts it. The anatomy of the tonsils is such that they are in constant motion and they are continually exposed to attrition and chemical irritation by all that enters the mouth and passes down the pharynx. They are thus accessible to many sources of irritation and infection, so that it seems rather strange that they are so seldom the seat of neoplastic growths. In brushing teeth, directing the brush too far back will undoubtedly irritate the tonsil and is a factor in the causation of malignancy. In explanation of this, Matthews points out that the tonsil has fulfilled its purpose before the age of puberty, and before the age at which malignant growths are apt to occur they have lost most of their blood supply and have become atrophied masses of inert tissue. It is also a matter of interest that there is a second period of life activity after the age of 40 years, and it is during this period of life that sarcoma and carcinoma most frequently occur. It would seem that chronic recurring inflammatory processes are important etiologic factors in determining malignant growth. Sarcomatous degeneration may follow inflammatory processes directly, while carcinoma may be favored by the inclusion of epithelium in the ulcers, in accordance with Cohnheim's theory. A review of the reported cases shows that men are far more frequently affected than women; in fact, but few cases in women have been reported. This is explained by most authors on the ground that men are exposed more frequently and constantly to irritation of the nose and throat.

A rather strange theory has been advanced by Kelling, who believes that certain embryologic cells of different animals may become deposited by insects in the circulation and that it is the proliferation of these cells which produce the malignant growth. There are naturally few adherents to this hypothesis, the theory of Cohnheim being the one generally accepted.

While polyps would seem to have little influence in the causation of cancer, it has been well proved that papilloma and adenoma are frequently the forerunners of malignancy. Wurtz claims that there

is a very definite relationship between syphilis and cancer of the throat.

Symptoms: In most cases of carcinoma, pain is a prominent symptom. It is usually lancinating, and radiates toward the ears. There is frequently considerable salivation, and with lymphatic involvement the tongue may become restricted in its movements. With ulceration and breaking down of the tumor the patient becomes cachectic, and as swallowing becomes more difficult, nutrition is interfered with and the patient becomes greatly emaciated. In sarcoma the appearance of the growth is at first like that of a hypertrophied tonsil, but it soon reaches into the supratonsillar area, causing a bulging not unlike peritonsillar abscess. There is limitation and fixation of the jaw, as in carcinoma. The speech defect is that described by Beck as "the mouth full of mush type". The patient rarely has difficulty in breathing until late, because the nose is free. The patient, however, snores deeply.

Diagnosis: Considerable difficulty is sometimes encountered in reaching a diagnosis. Carcinoma has to be distinguished from primary chancre, breaking down of a syphilitic gumma, ulceration due to septic processes, and even from acute tonsillitis, while sarcoma in the early stages may be mistaken for quinsy. A chronic swelling resembling quinsy should always be viewed with suspicion.

A primary chancre will offer little difficulty in diagnosis, as it is less likely to occur at an age when carcinoma usually appears. A syphilitic ulcer is more rapidly destructive than a malignant lesion, but the pain is less and the patient does not lose weight so rapidly. Then the Wassermann and the therapeutic tests will soon demonstrate the actual nature of a syphilitic lesion. If it is a question as to whether a tumor is a carcinoma or a lesion of tertiary syphilis, it is well to remember the hard, raised edge of the malignant ulcer, in contrast to the congested, serpigenous edge of the syphilitic ulcer.

Ulcerating sarcoma may be mistaken for tuberculous ulceration, but the evening rise in temperature, the presence of a pulmonary lesion, the von Pirquet, and the finding of the tubercle bacilli, will serve to distinguish the latter lesion.

The fact that a tonsil is the seat of a noninflammatory lesion in adult life should immediately suggest the possibility of malignancy, and it should be borne in mind that no diagnosis is complete without microscopic examination. Do not, however, make a biopsy, as it invariably tends to hasten the spread of the disease and a fatal outcome. This differential diagnosis may prove of value.

SARCOMA.	PERITONSILLAR ABSCESS.
1. Onset slow.	Onset sudden.
2. No pain; no heat.	Pain and heat.
3. No redness; slight swelling.	Redness and swelling.
4. No temperature.	High temperature.
5. No sweats.	Usually sweats.
6. No body pains.	General body pain.
7. No headache.	Headache.
8. Tumorous mass not painful to touch.	Very painful to touch.
9. No fluctuation.	Fluctuation.
10. No pointing.	Pointing as case advances.
11. Neck glands large, hard and very painful.	Painful glands and not so hard.

Prognosis: The prognosis of all malignant growths in the tonsil or peritonsillar region is, when treated by surgery, exceedingly poor, and while it is somewhat more encouraging with irradiation treatment, the permanent cures are still comparatively few, or no cure at all. The outlook in cases of sarcoma is much more hopeful than in carcinoma, provided the cases are seen and diagnosed very early. A considerable number of cases of this type of malignancy are recorded in which apparently permanent relief has been secured. If the growth is small and still encapsulated it may not return. Adenosarcoma, however, can seldom be so completely eradicated that it will not eventually return and end the life of the patient. We find one case of adenosarcoma of the right tonsil in which a cure was apparently effected by the implantation of radium emanation tubes. The case was that of a woman, age 81 years, with a mass the size of an orange protruding into the pharynx and extending downward toward the neck to the under surface of the right lower jaw. The mass was thoroughly anesthetized, and emanation seeds, consisting of small glass papillaries containing radioactive substance, were embedded in it. Three weeks after the treatment the throat was entirely free from the tumor mass, and all symptoms had disappeared.

Treatment: In spite of the almost hopeless prognosis of malignant growths of the tonsil and throat when treated by radical surgery, this has been the only chance of relief that could be offered to the victim until within the past few years, when radium and the X-rays have given some encouraging results, employed alone or in conjunction with surgery. Ewing, in 1922, writes: "It seems probable that the prognosis of buccal cancer will be influenced by the introduction of radium. This agent either alone or in combination with surgery has produced encouraging results, especially in localized cases of lingual, tonsillar and pharyngeal conditions and in advanced stages."

The surgical operations were extremely serious, involving as they did the removal of the entire pharyngeal growth in a cloak with the cervical glands. Matthews, in 1912, collected 35 cases in which radical operation was performed. Of these, four died as a result of the operation, and 13 others died within six months. There were two without recurrence after six months, two after one year, and four after two years. Up to this time, Jacobson's case, operated upon in 1901, was the longest without recurrence—11 years.

Ligation of the carotid arteries for the purpose of starving the growth was recommended by R. H. M. Dawbarn, Cheever, Mikuliez and other surgical procedures recommended.

Coley, in 1914, reported four cases, probably all lymphosarcoma, which were without recurrence for periods ranging from one to 8½ years following the use of his toxin alone. He states that of other operative procedures no good results are reported. A few years later, Guthrie collected from the literature 180 cases of sarcoma. Of these, 48 were operated upon by external pharyngotomy and dissection of the lower jaw, in 21 cases combined with enucleation of the tonsil, by dissection through the mouth in 27 cases. Of 33 cases traced, only 10 were free from recurrence; four were alive three months after operation, and six are known to have survived a year or more.

Up to four years ago only a few scattered cases of malignancy of the tonsil had been reported in which radium, either alone or in combination with the X-rays, had given good results. In 1922, Quick reviewed the various procedures that had been employed in dealing with malignancy of the tonsil and throat and reported his experiences with a series of cases treated by radium, applied according to the Janeway method of burying radium emanations in tubes, both in the tonsil and in cervical nodes. This method was first introduced by H. H. Janeway at the Memorial Hospital, New York, in 1917, and has since proved to be of inestimable value. Quick found that in comparison with other intraoral neoplasms, those of the tonsil are particularly susceptible to radium, but once the disease extends beyond the tonsil, the problem of its control becomes more complicated. It very often extends across the base of the tonsillar pillar to the tongue, and then one encounters all the difficulties incident to cancer of the tongue. Quick states that in lymphosarcoma or the malignant granulomas of the tonsil, surgery plays no part whatever. Metastases to the cervical glands, he believes, should be treated by the X-rays and radium only. During the five years prior to making this report, 149 cases of malignancy of the tonsil and pharynx, many of them in

an advanced stage, were treated by radium, in fact some of the cases were so far advanced that the author was of the opinion that it would have been better had no radium been used. Of the 149 cases, 124 were followed up; 28 were clinically free from the disease; two others remained free from recurrence for 15 months, when they were lost track of, and 20 still under treatment at the time the report was published were progressing favorably. Since thorough and efficient radiation involves putting the patient through a painful period, Quick believes that unless complete regression can be hoped for, such a procedure is unwarranted. Metal needle, which gave the total benefit of both Beta and Gamma rays, containing radium salt, 1 m.c. each, were employed.

Another rather extensive series of cases was that studied by Leon H. Smith, comprising 40 cases of epithelioma of the tonsil and surrounding structures. These patients were treated at the State Institution for the Study of Malignant Disease, Buffalo, N. Y. Of these 40 patients, only 12 admitted previous attacks of sore throat or tonsillitis; 75 admitted having used tobacco excessively. Twenty-three of the 40 cases received combined treatment; five, fractional radiations; and 12, radium packs. Of the entire number, three are clinically well and performing regular duty for two to 3½ years. Many others are doing their work, though the new growth has not disappeared. Seventeen patients have died; eight from hemorrhage, usually venous; two from general sepsis; four from edema of the epiglottis, and three from profound toxemia. In the treatment of these cases radium emanation glass beads were implanted directly into the growth, where they were allowed to remain, to slough out or to become encysted. In order to wall off cellular activity, deep X-ray treatment or a radium pack was applied to the cervical region. This observer found that deep X-rays cause less secondary infection than radium.

This experience seems to correspond with that of Henry K. Pancoast, who at an earlier period reports his experience with the combined use of radium and the X-rays in the treatment of malignant diseases of the throat and sinuses. He states that in the treatment of inoperable malignant growths originating in cavities, such as the mouth, throat and ear, radium therapy is an exceedingly valuable adjunct, for the reason that it can be applied directly to the growth, which is more or less inaccessible to direct Roentgen ray exposure. But this alone is not sufficient, and the growth should also be attacked from every possible direction by crossfiring, either by radium or by X-ray or both. Pancoast recommends continuing the treatment for some time after the disappearance of the growth.

Grier, in a recent report, states that he has been unsuccessful in causing complete disappearance of metastatic malignancy in the neck by burying radium in the masses. He had a mortality of 100 per cent in those cases, no matter how treated, until he used deep X-ray therapy. By the use of deep therapy and radium he has had two cases apparently cured, although both had metastatic masses as large as a fist when first seen. Grier uses radium element instead of the emanation, care being taken not to overdose, or else slough will result. He believes that nine hours is the maximum length of time that 10 m.g. needles should be left in the tonsil, and thinks the radium emanation is preferable where it is available. After an experience with surgery followed by the X-rays, surgery with the insertion of radium into the wound, radium applied externally without operation, he finds that the only method that has resulted in the complete disappearance of the growth without recurrence is the high-voltage X-ray treatment. This is the only method with which he has been able to cause the complete disappearance of large cervical metastases. A definite erythema dose is given over the whole affected side before anything else is done, using the deep therapy machine, 20-inch skin focus, distance, 200 kilovolts, 4.5 milliamperes, 0.5 m.m. copper and 1 m.m. aluminum filters, over an area 4 inches square for 90 minutes. If 10 m.g needles are used, they should be placed about 1 inch apart and left for seven to nine hours. There is still another method of treatment that has been used in the effort to obtain better results in the treatment of these malignancies, namely, electrocoagulation in combination with radium and the Roentgen rays, or radiodiathermy, as it has been termed by Sir William Milligan. In 1917, William L. Clark reported his results with electrothermic methods in combination with surgery, the Roentgen ray and diathermy in the treatment of cancer within the oral cavity. In his series of 200 cases there were five localized tonsil cases. Of these, three did not recur in from one to two years; two had local recurrence, the glands became involved and they could not be treated again. By electrodessication or electrocoagulation, growths of small or moderate size may be destroyed by the utilization of heat of just sufficient intensity to dessicate the tissues. This is effected by the monopolar high frequency current of the Oudin type, which is applied by means of a steel needle or other pointed metallic applicator. In Clark's cases, surgery was practiced first, followed immediately by electrothermic treatment to check hemorrhage and to reach malignant tissue which could not be reached by the scalpel or bone-cutting instruments. Deep, crossfire Roentgen therapy was applied to the neck after dissection of the cervical glands, with the idea of preventing recurrence. Radium may be used in-

stead of the X-rays, but they should never both be used, according to Clark's experience with this series of cases. In a recent communication from Dr. W. L. Clark, he writes: "I have treated during the past 10 years about 60 cases of primary carcinoma of the tonsil; some early, others advanced and with extensive metastasis. The guide to treatment was the extent of the disease, the physical condition of the patient, and the type of tumor.

"We have been grading, for a number of years past, our squamous cell carcinomas according to the method of Broders. Type 4, in which there is practically no differentiation of cells, responds very well to radiation treatment, either X-ray or radium, but preferably radium. There is, however, a tendency to recurrence in many of these cases sooner or later. Type 3, in which there is a tendency to differentiation, also responds fairly well to radiation treatment, and this method is usually employed alone. Type 2, in which there is considerable differentiation, and also Type 1, in which the cells are almost completely differentiated, do not respond well to radiation treatment, although they are slower in growing and metastasize later. In these cases, electrocoagulation is employed when possible. If the lesion is deep, a primary ligation of the external carotid, and even sometimes of the common carotid artery, is performed to obviate the danger of secondary hemorrhage. In case there is difficulty in swallowing and the patient is suffering pain in deglutition and is not receiving sufficient nourishment, a preliminary gastrostomy is performed, which enables suitable feeding and the patient not uncommonly gains very much in weight.

"The results, therefore, depend upon the type of tumor and the systemic complications which the patient may suffer. Of course, any possible diabetic complication, cardiorenal disease, lues, etc.,.must be taken are of concomitantly."

In the *British Medical Journal*, of Feb. 27, 1926, Sir William Milligan describes his method of treating inoperable malignant disease of the upper air and food passages, which he calls radiodiathermy, a combination of surgical diathermy and radium. He declares that the most brilliant and lasting results of this method of electrocoagulation of malignant growths or areas of ulceration are to be obtained in neoplasms of the upper pharyngeal cavity—the palate, tonsil and base of the tongue. The principle underlying this treatment of diathermy is that the tissues against which the active electrode is applied resist the entrance of the high frequency current, with the result that a degree of heat is generated to cause complete tissue necrosis. Small and accessible growths are in this way de-

stroyed. The diathermy treatment is followed by the application of radium or the X-rays.

In my opinion, the only sane method of treatment of primary malignancy of the tonsillar and peritonsillar region is as follows: After having made a diagnosis and having satisfied yourself that the condition is one of malignancy, the first step should be exposure of the mass to the Roentgen rays by a competent and expert Roentgenologist. In other words, turn the case over to the Roentgenologist for treatment. If the mass has been reduced to the size of that which a normal tonsil is and the glandular involvement has subsided, and then if you think surgery is indicated, then a primary ligation, proceed with the enucleation of the mass. Be careful, however, to use the cautery and not the knife. The use of the cautery serves two excellent purposes; first, it prevents metastatic involvement; second, it sears the cutting surface, and prevents hemorrhage or troublesome oozing, as we so often see in malignancy, despite a primary ligation. After such operation, though successfully performed, the patient should be kept under constant observation and subjected to the Roentgen rays whenever the Roentgenologist deems it advisable. I am rather averse to the radium treatment, because of the uncertainty of their destructive powers outside of the mass area, thus giving you an almost uncontrollable and ofttimes a fatal hemorrhage.

CONCLUSIONS.

In conclusion, I beg to emphasize the following factors:

1. Primary malignancy is not as uncommon as it was formerly thought.

2. An early diagnosis is important and may save the life of the patient.

3. Never puncture a tonsillar or peritonsillar mass when symptoms of tonsillar or peritonsillar infection are absent.

4. Never take a biopsy when of the opinion that it is a borderline case.

5. If a biopsy must be taken, use the cautery instead of the cold knife.

6. Always consult with a surgical pathologist when you cannot make a diagnosis.

7. Always refer your patient whose diagnosis is doubtful to the Roentgenologist.

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LATENT DISEASE OF THE MAXILLARY SINUS.*

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It is not generally believed that latent disease of the maxillary sinus is of frequent occurrence. A careful examination of many patients, however, has convinced us that this cavity is many times mildly or markedly involved, and that the pathological changes in the antrum have very often remained unrecognized because of the lack of symptoms referable to the nose. Under normal physiological conditions, the antrum cavity is lined with a mucous membrane which is nonsecreting. As soon as pathological changes occur, however mild in nature, the picture changes. What was once a sterile cavity now becomes an infected one. The mucous membrane becomes edematous, and after a short space of time, the active inflammation subsides, and there may remain in the cavity of the antrum, especially in the recesses, an edematous mucous membrane of low vitality, with a predisposition to recurrent infections. After many attacks of inflammation, it is also possible to have an atrophic, pyogenic membrane of the antrum, instead of an edematous or hyperplastic variety.

Long-continued absorption from a low grade infection, undoubtedly in the course of time, has a deleterious effect on the cardiovascular, renal and nervous system; so that, when we, as rhinologists, uncover a hidden focus of infection within an antrum, we may be assured that we are forging another link in the progress which is being made in preventive medicine. The marked involvement of the general health of many of our patients, and the rapid gain in weight following the radical removal of pathological tissue from an unsuspected antrum, is proof in our estimation that chronic toxemia from this cavity is very often a sufficient reason for the patient's state of ill health. It has impressed us also with the pertinent fact that a toxemia may be caused as readily by a low grade infection, without demonstrable pus within a bony cavity, as it is caused by a purulent infection.

In the consideration of this subject, we are not referring to the hyperplastic form of maxillary sinusitis which is so often associated with hyperplastic ethmoiditis and the presence of polypi in the nose. It is true, we have often found antrum disease associated with a

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hyperplastic ethmoiditis, and in our earlier cases, at a time when we did not suspect the presence of antrum disease, we were disappointed because of the continuance of symptoms after a radical exenteration of the ethmoid cells. If we, therefore, fail to recognize an existing disease of the antrum and proceed with an ethmoid exenteration, we shall be disappointed with the results of the operation, and subject the patient to further operative procedures. In the majority of our patients with latent antrum disease, the nasal examination was negative, except for the presence in a few instances of a mild ethmoiditis. There was never a marked polyposis in the nose, but the antrum cavity itself had undergone marked polypoid changes. This observation has impressed us with the fact that maxillary sinus hyperplasia may, in many instances, be the forerunner of a nasal polyposis.

One of the important points we wish to emphasize in this paper is that by means of careful study of each individual case, and by the use of various diagnostic means at our command, we are better able to inform our patient, prior to the time of an intranasal operation, regarding the possible presence of disease in the nasal accessory sinuses, especially the antrum. We have also been impressed with the fact that our best results in nasal accessory sinus surgery have occurred when we recognized the presence of a latent disease of the antrum at the time of doing an ethmoid operation, and consequently dealt with the antrum in a radical way, at the time of the ethmoid exenteration. As a consequence of this method of procedure, we were able to recognize displaced inferior hiatus cells, uncover the cells of Haller, if present, and remove the hyperplastic changes of the membranous antral wall. As a matter of fact, we deem it advisable in each instance to thoroughly inspect the middle meatal antral wall at the time of the radical antrum operation, and remove, if necessary, a greater part of the wall, especially if hyperplastic changes have occurred in this region.

Individuals with latent disease of the maxillary sinus consult the rhinologist at frequent intervals. They are given routine treatment, are slowly relieved of the acute symptoms, cease their visits, only to return after a short space of time with another attack. The rhinologist does not suspect antrum involvement, because of the absence of pus and pathological changes in the nose. These patients are very often treated conservatively for many years, without a consideration having been given the antrum as the cause of their frequent discomfort. It is true, that in many of these patients, the nasal manifestations are but a small part of a general toxemia originating in the intestinal tract. It is also right to assume that a patient with intestinal toxemia will very readily be affected with symptoms referable to the

nasal chambers, if there is present a "locus minoris resistentiae" in the form of a latent sinus disease.

We must not depend too much on the appearance of the skiagram, when our suspicions are aroused that the antrum is pathologically involved. It has been our experience to find marked hyperplasia in the deep recesses of the antrum, in patients with a clear skiagram and negative lavage. In two of our patients who were under treatment before the days of lipiodol instillations into the antrum, we were loath to operate because of our negative findings, both clinically, as well as per skiagram. In both instances, however, the patients insisted upon exploratory operations through the canine fossa, because of a feeling of pressure in the upper jaw and, much to our surprise, marked hyperplasia was found within the deep recesses. In doubtful cases we must, therefore, resort to further means for diagnosis, and in our mind lipiodol instillations are very often of great value; so that, with their use we are able to surmise the presence of polypoid changes, which cannot be detected in any other way, except perhaps by probing, or inspection by means of an antrascope.

Lavage of the antrum is very often negative. Especially is this true when there is good drainage, because of the presence of a large accessory ostium. The negative skiagram and the negative findings upon irrigation are the two factors which very often lead us astray. It often happens that the skiagram shows the antrum to be opaque, and that irrigation reveals the presence of pus. After several irrigations, the pus disappears. In this class of patients, the antrum should again be irrigated a week later, preferably in the morning hours, and, if necessary, lipiodol installations should be made at this time. If the lipiodol test shows a marked filling defect, and there is a history of frequent nasal infections, we may rest assured that we are dealing with a latent antrum disease. It behooves us, therefore, in order to exclude the presence of latent antrum disease, to make repeated examinations on patients who have apparently recovered from an acute maxillary sinusitis.

A predisposing anatomical cause of frequent infections of the maxillary sinus is, without doubt, the presence of an os accessorius. This is an acceptable explanation in many instances of maxillary sinus infections following a nasal or pharyngeal inflammation. We have all been impressed with the fact that when nasal polyposis was present to a marked degree, and the maxillary sinus at the time of operation was found to be filled with polypoid changes, that we could invariably demonstrate the presence of an enlarged normal or an accessory opening, through which the polypi made their exit into the nose. It must not be forgotten that a latent disease in the alveolar

recess of the antrum may be caused by the presence of infective processes, in and about the teeth, the disease readily becoming manifest after tooth extraction.

When are we to suspect a latent disease of the antrum? It is a remarkable fact that except for the presence of repeated vasomotor disturbances of the nasal mucosa, few, if any, local changes are to be found in the nose. The presence of a hyperplastic ethmoiditis, a protrusion of the membranous middle meatal wall of the antrum, a polypoid change of the inferior turbinate, especially in its posterior third, should make us suspicious of the possible presence of an antrum disease. The history of repeated colds and long-continued postnasal discharge of mucus are other factors that should direct our attention to the condition of the antrum. Many of our patients suffered more from a systemic derangement as a result of the chronic toxemia than they did from any local disturbance in the nose.

It is rather infrequent that patients complain of pain in the antrum region, although a feeling of pressure and pain in the region of the antrum may be present, without much pathological change having taken place in the cavity. The pain is very often the result of an edematous antrum mucosa which is present in the region of the ostium, and which causes complete closure of this opening, and consequently lack of ventilation. We have met with several of these cases, and believe that the pain and pressure are caused by a vacuum which forms in the cavity.

We have all had the daily experience of seeing patients with repeated colds, in whom no definite cause could be ascertained. It very often happens that the so-called "cold" is nothing more than a vasomotor disturbance of the nasal mucosa, caused by the presence of a latent antrum disease. The intimate relationship existing between the antral nerves and the sympathetic, readily explains the reflex and inflammatory changes which may take place in the nose as a result of irritation within the sinus cavity. Especially should we suspect a latent antrum disease, when the vasomotor disturbance is unilateral. It has been our experience many times to see the nasal mucous membrane, which for a long period of time was found to be in a turgescent state, return to a normal appearance a few weeks after the removal of a latent disease of the maxillary sinus. Many of these patients had been subjected to various diagnostic tests, such as protein sensitization, the nasal mucosa had been cauterized, and in a few instances a part of the inferior turbinate had been resected —all without avail.

Furthermore, we have come to a definite conclusion that very often pathological changes in the antrum are responsible for many of the

aggravating symptoms of hay fever, and that irrigation of the antrum with hypertonic salt solution during the attack of hay fever will often bring immediate relief. We have had under observation for the past five years, a patient who has a latent antrum disease involving both sides, but who refuses operation in view of the fact that a former ethmoid operation did not give her relief; and irrigation of her antra with hypertonic salt solution causes a disappearance of the hay fever symptoms within a few days. This patient usually has several attacks every year; in the early spring and again later on during the hay fever season in August. Each time the antra are irrigated, she obtains immediate relief, and at no time does the irrigating fluid show the presence of pus, but instead a viscid, stringy mucus. The antra in this case are irrigated with great ease, because of the presence of large accessory ostia, through which a cannula readily passes. We have never been able definitely to explain whether the irrigation of the viscid mucus, or a reflex nervous influence is the cause of the vasomotor disturbance of the nose. We are inclined to the belief that it is the hypersecretion of mucus which is the cause, especially since with the disappearance of mucus from the antrum lavage, there is also an abatement of the apparent hay fever. When the patient first came under our observation five years ago she was treated for many weeks with various well known remedies for hay fever, without obtaining benefit. Observations made on other patients warrant the statement that hay fever symptoms are often aggravated by the presence of a latent antrum disease; and the irrigation of the antrum very often gives prompt relief.

Other symptoms which may be present, such as tinnitus, lack of concentration, vertigo, gastrointestinal manifestations, repeated colds, eye affections, bronchitis and asthma, are not as a rule believed to be caused by a latent disease of the antrum, if the nasal examination reveals nothing abnormal. Of special interest have been the observations made on several patients suffering with tinnitus, in whom, after the removal of the latent antrum infection, there was a complete disappearance of this distressing symptom.

A diagnostic means which we consider of great importance in detecting a latent antrum disease is the instillation of lipiodol. The method of instilling the lipiodol is as follows: After thorough cocainization of the lateral, middle meatal wall of the nose, a Ritter sound, No. 1, is placed in the region of the normal orifice of the antrum, in order to learn of the patency of this opening, and also to ascertain the possible presence of an accessory ostium. If a normal or accessory opening is found, a Siebenman's cannula is next introduced. If no opening is present, firm pressure is made against the membranous

middle meatal wall with a Ritter sound, and the same punctured before inserting the cannula. The cavity is next irrigated with a hypertonic salt solution and insufflated with air, until the irrigating fluid ceases flowing from the nose. The lipiodol solution is next slowly instilled into the antrum, with the patient's head reclining towards the shoulder of the same side. The injection is continued until it is felt to be under pressure, and there is an overflow from the nose. A large cotton tampon is next placed in the middle meatus with the head of the patient remaining in the side position. The skiagram is then taken.

The appearance of the skiagram after the lipiodol installation in the presence of a latent antrum disease is variable. There is a bare possibility of the oil filling the entire cavity, if there happens to be present a thin, pyogenic membrane, instead of an edematous or a hyperplastic one. Hyperplasia within deep recesses only, with the cavity of the antrum uninvolved, is very often the reason for the lipiodol showing no filling defect on the skiagram. In these cases, we also frequently find a negative skiagram and it is our opinion that when clinical symptoms make us suspicious of antrum infection, we will display good judgment in advising exploratory opening in the canine fossa, even though the lipiodol test and the skiagram are negative. In other words, the two above-mentioned means for diagnosis are not infallible. In most instances, however, we find only a part of the cavity filled with lipiodol, the filling defect depending on the amount of hyperplasia which has invaded the cavity of the antrum.

The cases here reported are those in which there was present no definite clinical evidence upon rhinoscopic examination of chronic antrum disease, with the exception that there was a history of frequent colds, and nasal examination showed, at times, a vasomotor disturbance of the nasal mucosa, with occasionally a mild hyperplasia in the ethmoid region. Quite a few of the patients had a former ethmoid operation, without benefit.

CASE REPORTS.

Case 1: E. W. S., male, age 30 years, first seen Nov. 18, 1925, at which time he complained of a feeling of fullness in the head, with pain in the frontal region on the left side.

Nasal examination was negative except for the presence of a marked deviation of the septum to the left, and a turgescence of the left inferior turbinate. A skiagram of the nasal sinuses was negative.

On Nov. 21, 1925, a submucous resection of the septum was done. The patient experienced no relief of symptoms, and was seen at frequent intervals for the treatment of a vasomotor disturbance of

the left inferior turbinate. Another skiagram was taken Feb. 2, 1927, at which time the left antrum was found opaque. Lavage of the left antrum revealed a large quantity of mucopus. After a few irrigations of the antrum, there was a complete disappearance of the mucopurulent secretion. Oct. 24, 1927, the patient returned for treatment, and stated that he still suffered with pain over the left eye and nasal obstruction on the left side. Examination of the nose revealed a turgescence of the left inferior turbinate. Irrigation of the antrum was negative; there was no pus in the middle meatus. Instillation of lipiodol showed that there was present a large filling defect.

A radical maxillary sinus operation was done on Oct. 26, 1927, and a large quantity of hyperplastic tissue removed from the antrum. The hyperplasia was present chiefly in the malar and prelacrimal recesses. The patient has been entirely relieved of nasal obstruction and headache since the operation.

Comment: We were undoubtedly in this case dealing with a latent sinus disease at the time of the septum operation, in view of the fact that the turgescence of the mucous membrane of the inferior turbinate continued after the correction of the deviated septum. The negative skiagram at the time of the first examination was in all probability due to the fact that the hyperplasia occupied the recesses of the antrum only, the cavity of the antrum being free, and therefore a negative skiagram was obtained.

Case 2: R. C., male, age 25 years, gives a history of severe attacks of asthma for the past eight months. He has a postnasal discharge and intermittent nasal obstruction on both sides. A septum operation had been performed several years ago.

His inferior turbinates were hyperplastic, and both middle turbinates were displaced laterally, against the wall of the nose. Infraction of the middle turbinates showed a hyperplasia of the ethmoid cells. X-rays of the sinuses showed a clouding of the ethmoid region. Frontals and antra were clear.

A bilateral ethmoid operation was done on June 27, 1927. Following the operation there was an acute flare up of what was probably a latent antrum disease on the right side. After a few irrigations, the antrum secretion subsided. Six months later, another X-ray was taken of the sinuses, which showed partial clouding of the right antrum. Lipiodol instillation was made and showed the antrum to be about half-filled with the lipiodol solution.

Comment: This patient refused further operative intervention on the antrum, and it is highly probable that a more careful study of the antrum at the time of the primary operation on the ethmoid might have revealed a hyperplasia in this cavity. It is our firm belief that

when lipiodol instillations demonstrate the possibility of hyperplasia being present in the antrum, that the antrum cavity should be investigated at the time of the nasal operation, especially if a patient is suffering with asthma.

Case 3: G. S., male, age 30 years, first seen Nov. 10, 1927. The chief complaint was a dropping of mucopus, postnasally, affecting the stomach. The patient also gives a history of having had many attacks of colitis.

Nasal examination showed a deviation of the septum to the right; and it was impossible to see the middle meatus, because of the deviation. The skiagram showed a clouding of the right antrum and ethmoid. Lipiodol injected into the right antrum showed only a small quantity of oil to be disseminated throughout the cavity.

Dec. 5, 1927, a right radical maxillary sinus and septum operation was performed. At the time of operation, a large mass of hyperplasia was removed from the antrum, and there was present a considerable amount of inspissated pus in the alveolar recess; the ethmoid cells had also undergone hyperplastic changes.

Comment: This patient had been treated for many years for disturbances of the stomach and intestines, without any relief. Since the operation, he has had complete relief of the colitis. The deviation of the septum prevented a more careful inspection of the middle meatus, so that pathological changes in this region could not be detected. Lack of careful study in this case, and the mere removal of the nasal obstruction caused by the deviation of the septum, would have prevented a good result after operation.

Case 4: J. E. W., male, age 23 years, first seen on Oct. 31, 1927, with a chief complaint of attacks of sneezing, and watery discharge from the nose for the past year.

Nasal examination was negative, except for a slight hyperplasia of the anterior end of the middle turbinate on both sides. The patient also gave a history of a cough, which had been present for the past year. Skiagram of the sinuses showed the left antrum cloudy, right clear. Irrigation of the antrum was negative. Lipiodol injected into the cavity after irrigation showed that there was present a large filling defect.

Nov. 1, 1927, a radical antrum operation was done on the left side; a high deviation of the septum was corrected, the middle turbinates infracted, and a bilateral ethmoidectomy performed. A marked hyperplasia was found in the malar and palatine recesses, and also marked hyperplasia in the ethmoid cells.

Comment: A negative washing of the antrum in this case, without the instillation of lipiodol, would in all probability have caused us

to desist in our efforts at investigating the interior of the antrum, and we would have proceeded with an intranasal operation, such as correction of the deviated septum and the ethmoid exenteration. Such a procedure would have undoubtedly met with failure, and the symptoms of sneezing and postnasal discharge would undoubtedly have continued. This patient was relieved of all symptoms immediately following the operation.

Case 5: Mrs. P. M., age 60 years, has suffered for the past five years with a tic doloreaux on the right side.

Nasal examination was negative. Irrigation of the antrum on the right revealed a large quantity of pus. Lipiodol instilled into the cavity showed the greater part of the antrum filled with the oil. Because of the severe symptoms of tic doloreaux, and the fact that the patient had been suffering for many years, it was decided to do an immediate radical antrum operation. At the time of operation, a very thick, hyperplastic tissue was found, which was adherent to the bone. Marked hyperplastic changes had taken place in the region of the middle meatal wall; the ethmoid also contained hyperplasia in the posterior cells. Microscopical examination of the specimen removed from the antrum showed chronic inflammatory changes of the mucosa; no evidence of malignancy.

Comment: The patient has been entirely relieved of the tic doloreaux since the operation.

Case 6: F. H., age 30 years, consulted us on Nov. 7, 1927. The patient has had asthma for the past 20 years. He has had three former nasal operations, without relief. For the past four years he has lived in California, but the asthma, although not severe, has still continued to be present. He also complained of frequent attacks of infection in the nose, which are always followed by an attack of asthma.

Nasal examination revealed a marked turgescence of the left inferior turbinate, with a hyperplasia of the anterior and of both middle turbinates. X-rays of the sinuses show the antra clear, frontals clear, haziness of the ethmoid, especially on the left side.

On Nov. 9, 1927, a remaining high deviation of the septum was corrected, and hyperplasia removed from the ethmoid cells. Part of the anterior end of the middle turbinate on both sides was removed. Immediately following the operation, there was present an acute maxillary sinusitis on both sides, which subsided after several washings. Two weeks following the operation, lipiodol was injected into both antra. Both cavities were only half-filled with the solution. On Dec. 31, 1927, a radical left antrum operation was performed. The cavity was found to have a large prelacrimal, palatine and alveolar

recess, which were filled with hyperplastic tissue. On Jan. 12, 1928, a radical antrum operation was performed on the right side. This cavity also contained a palatine recess, which was filled with hyperplasia.

Comment: Since the operation, the patient has had but one mild attack of bronchial asthma, and is again living in California. The unusual factor in this case was the fact that the skiagram of the antra was negative. This can be explained by the fact that most of the hyperplasia which was present in both cavities, occupied large palatine and alveolar recesses. The acute flareup of the latent antrum disease, following the ethmoid operation, was the first indication of the presence of disease in this cavity.

Case 7: Mrs. N. W., age 40 years, consulted us March 3, 1928, with a history of having had an incessant cough for the past four years.

Examination of the nose was negative. The tonsils had been removed. Mucous membrane of the trachea was thickened. X-rays of the sinuses showed a clouding of both antra and ethmoid. Instillation of lipiodol showed a large filling defect on both sides.

On March 10, 1928, a left radical antrum and ethmoid operation was done. The antrum cavity contained a large mucus plug, and the mucous membrane was edematous, especially in the region of the recesses, where a slight hyperplasia had begun. The ethmoids were also hyperplastic. On March 17, 1928, a right radical antrum and ethmoid operation was performed. The entire mucous membrane was edematous and slightly hyperplastic, and the alveolar recess contained inspissated pus.

Comment: Almost immediately following the last operation, there was a complete disappearance of the cough. This patient had been treated for four years, without any relief. She had had her tonsils removed, X-ray examination of the chest, intratracheal injections made during this time. The latent antrum disease was the cause of her bronchitis.

Case 8: R. H., age 35 years, for the past year has been suffering with melancholia, severe headaches, and pains in the joints. He has been under the care of numerous physicians, without receiving any benefit.

Nasal examination showed a marked deviation of the septum and evidence of a hyperplastic ethmoiditis. The skiagram of the sinuses showed the frontals and antra to be clear.

On March 22, 1928, a septum and bilateral ethmoid operation was done. The patient's general condition improved during the first month after operation, but all the symptoms returned after this time.

On June 4, 1928, he returned, stating that his headache was now confined chiefly to the right side, and that the general symptoms, such as pains in the joints and marked mental depression, had again become manifest. Another skiagram of the sinuses was taken and the antra were again shown to be clear. Because of the marked turgescence of the inferior turbinate on the right side, it was decided to irrigate the antrum. Same was done and a fair amount of mucopus was found. On the following day, a radical antrum operation was performed and all the recesses were found filled with marked hyperplasia.

Comment: The patient has had an unusual change in his mental condition since the operation, and feels now as if he is going to fully recover. The case is an unusual one, in so far that the skiagram of the antrum was absolutely negative. This is another instance of recess hyperplasia which, in our estimation, is present more often than is suspected. It is too early since the radical antrum operation to say whether complete recovery of good health will take place.

Conclusions: It is our firm belief that latent disease of the antrum, because of undue consideration of its possible presence, is very often unrecognized. In order to obtain good results following nasal surgery, careful diagnostic tests should be made before resorting to minor intranasal operative measures. In this way, we will have a more satisfied patient, in so far that repeated operations will not be found necessary. By removing every focus of infection from the accessory sinuses while doing such a simple operation as the correction of a deviated septum, we are less apt to have a postoperative sepsis as a result of the acute exacerbation of a latent paranasal sinus disease. It has been our experience that sepsis following simple intranasal operations was usually caused by the acute flareup of a latent paranasal sinus disease, especially of the antrum. We have seen less reaction and postoperative sepsis since we have made it a rule to remove radically the pathology present in the antrum while doing an intranasal operation.

We do not wish to convey the idea that all cases of latent antrum disease must be dealt with in a radical way. Intranasal operations on the antrum very often suffice. The intranasal measure, if necessary, should be done at the time of doing a septum or ethmoid operation and, furthermore, the patient should be told that a more radical operation on the antrum may be found necessary before a good result is obtained. A careful analysis, therefore, of each individual patient before proceeding with intranasal operations of any kind will be the means of giving us better results, and of preventing nasal accessory sinus surgery from falling into disrepute.

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VASCULAR CHANGES IN CHRONIC PROGRESSIVE DEAFNESS.

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Under the term of chronic progressive deafness there is here included cases of deafness showing the typical Bezold triad of otosclerosis, as well as the other types of deafness involving a progressive impairment of function of the inner ear. These observations have extended over a period of several years, and the study of the phenomena is still being continued.

Seldom in the course of these observations has that oft-mentioned diagnostic sign of otosclerosis—the salmon-pink injection of the promontory of the middle ear been noted. In this respect the experience of the writer accords with that of a large number of his colleagues. He has, however, noted pathologic changes in the drum and in the external auditory canal adjacent to it, which he has come to regard as of real diagnostic significance.

In a large series of cases of progressive deafness characterized by a raising of the lower threshold of hearing with or without dropping of the upper threshold, and alteration in bone conduction, which were not improved by inflation, *i. e.*, cases other than conduction deafness—the writer has observed a characteristic and constant injection of the vessels of the drum and of the inner end of the external auditory canal. This injection in no wise resembles the faint injection, generally of solitary vessels, to be found in catarrhal otitis and transitorily after politzerization. It is constituted by fairly widely dilated groups of vessels. These groups are as follows:

1. The manubrial plexus and its anastomoses, constituted by one or more vessels running upward, or upward and posteriorly, along the line of the handle of the malleus, towards the Rivinian fissure; and by a group of vessels running radially upward from that region above the membrana flaccida, along the posterosuperior wall of the external auditory canal.

2. The tympanic, or annular, plexus which courses along the periphery of the tympanic membrane near the annulus, giving off a series of radial, injected vessels, to the substance of the tympanic membrane, and anastomizing with the vessels of the external auditory canal.

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Either or both plexuses may be involved. The loss of hearing in acute cases is generally more marked when the tympanic plexus is involved; this one would expect because of the free anastomoses of the anterior tympanic, inferior tympanic and communicating branches of the internal auditory arteries. In the more advanced cases, there may be a massive erythema with some evidence of extravasation in the region of the Rivinian fissure, and the individual vessels of the plexus may not be readily distinguishable. At this time there may be seen a very faint pink streaking of the entire drum, due to a scarcely discernible capillary injection, indicating a pathologic vascular proliferation in the drum. With progressive changes in tympanic plexus, changes of an interstitial nature take place in the substance of the tympanic membrane, rendering it less transparent and radially streaked by dull gray fibrillae. In the less advanced cases, there may be seen at the periphery of the tympanic membrane, within the zone of the annular ligament, a narrow zone of translucent, pearly gray, fairly normal membrane through which dilated vessels may be seen arching inward to the central fibrosed zone. The writer finds it convenient to refer to these changes in the tympanic membrane as "interstitial myringitis". The external auditory canal adjacent to the annulus may show, in these cases, a more or less distinct erythema. In the more advanced cases, the injected vessels grow narrowed, and the adjacent tissues, ischemic. At this stage of the process, injection of the vessels of the more external portions of the external auditory canal make their appearance, frequently at the juncture of the bony and membranous canal. In the stage of erythema, the involved areas ooze blood on the slightest trauma. The external auditory canal of the more advanced cases appears to undergo trophic changes and normal cerumen is often replaced by scab formation; the removal of these waxy scabs causes oozing of blood.

Similar changes have been noted in the ear in primary, secondary and tertiary lues in a fairly large number of cases. What the significance of this may be remains to be determined, and studies along these lines are being continued.

Our knowledge of the pathology of otosclerosis and chronic progressive deafness indicates that these vascular changes in the external auditory canal are comparable to the changes found in capsule of the inner ear. Whether the changes in the external canal be due to compensatory circulation, secondary to stasis in the inner ear capsule, or to a continuation of the disease process remains to be determined.

An interesting corollary of the concept of vascular nature of the disturbance of chronic progressive deafness is the response of these

cases to vasodilators and constrictors, which has been recently remarked upon by Dr. Albert Gray.[5] Administration of the nitrites, nitroglycerin or ephedrine not infrequently results in a temporary but marked improvement of hearing. The writer has studied this reaction as an aid to the diagnosis, prognosis and possible aid in the treatment of these cases. From the point of view diagnosis and prognosis he has found it to be of real value. The ear which responds to one of these remedies by improvement in hearing cannot be regarded as having advanced to the stage of atrophy and nerve deafness; and often there is no need to wait for a period of remission to determine the extent of permanent loss of hearing. The extent of permanent damage can often be determined by the aid of these vasomotor reagents. An interesting by-action of the administration of vasodilators is the occasional clear demonstration of vestibular pathology—elicitation of nystagmus, past-pointing and falling to the side more extensively involved.

Of special interest in the study of C.P.D. is the progressive involvement of labyrinth and its functions. In our study of the vestibular functions we have stressed the grosser phenomena, the response to irritation. Nystagmus and vertigo do sometimes occur in the course of advance of chronic progressive deafness, and rotation, caloric and other tests may elicit evidence of grosser changes in vestibular structure. But a study of finer changes rests with finer tests.

Several years ago the writer[6] pointed out that the reverse testing of the vestibulo-ocular tracts, the determination of the oculo-vestibular reactions constitutes a fairly delicate and reliable test of vestibular reactions. An individual with a normal vestibular apparatus, when asked to point with eyes closed and turned in the direction of the pointing arm, without movement of the head, will past-point in that direction; when asked to point with eyes closed and turned in the direction opposite to the pointing arm, he will not past-point; and no past-pointing is normally elicited on turning of the head in either direction. What are the tracts involved, and what is the physiologic significance of the reaction remains to be determined. We know that there are both ascending and descending fibres in the tracts coursing between the vestibular, ocular, cerebellar and spinal centers; that the nucleus ruber and corpora quadrigmina are closely linked up with all three.

Some light is thrown upon this phenomenon, the oculo-vestibular reaction, by a study of the comparative physiology of vestibular reactions. In the lower vertebrate form, *viz.*, Selachians, lesions of

the vestibule result in permanent eye displacement (Maxwell[1]), indicating a more or less direct control of ocular muscles by the labyrinth. This eye displacement appears to be compensatory in nature; for disturbances in locomotion appear when the eyes are closed. In the turtle[2] also a permanent displacement of the eyes follows unilateral lesions of the vestibule, together with tortion of the head, more or less compensating it, so that the animal may grasp its food accurately. On the other hand, head reaction to the turning tests may persist in the turtle after lesions of both vestibules, when in the course of rotation the eyes are open and the field of vision not maintained constant; and not when the eyes are closed (Tredelenburg and Kuhn). Even in these lower forms there begins to appear oculospinal reactions in the form of eye-body-muscle co-ordinations. The connection of eye-body-muscle innervation and vestibule has become more complex with higher development of cerebration. It was in connection with studies on the horned toad, Phrynosoma, that Loeb[3] enunciated the principle of algebraic summation of optical and vestibular stimuli and pointed out the importance of either keeping the eyes closed or keeping the field of vision constant in rotation tests. Breuer[4] has demonstrated the truth of the last item in reference to birds.

The comparatively simple control of eyes and body muscle, by vestibular structures, and the control of body-muscle tone and eye innervation, in the lower forms, becomes increasingly complex in the more highly developed nervous systems of the mammals. The vestibular nerve tracts become interposed between the eye-body-muscle co-ordinating tracts, so that changes in eye muscle innervation do not result in normal body muscle reactions, except in the presence of an intact vestibular innervation. Depression and loss of vestibular function results in absence of oculo-vestibular body muscle reactions on the affected side; irritation of vestibular structures results in abnormal reactions.

The following cases illustrate the change in response to oculo-vestibular tests, with change in labyrinthine pathology.

Case 1: Mrs. L. B. S., admitted March 18, 1926, age 25 years. R. chronic otorrhea—duration 20 years. Hearing, C3 and C4. Drum in greater part destroyed, ear filled with granulations, marked purulent discharge. Frequent attacks of furunculosis of external canal. X-ray diagnosis: Chronic mastoiditis. March 15, 1927: The patient developed signs of labyrinthine irritation immediately following her return from out of town. Deafness, marked vertigo, nausea and vomiting, right-sided headache, sense of pressure on right side of

face and sense of weakness in it; temperature 104°; drainage of attic of tympanum blocked, spontaneous nystagmus to left, total deafness, air and bone. Suction was employed to re-establish drainage, with success, and rapid subsidence of symptoms followed. March 29: Patient was again put under dry powder treatment, polypi and granulations removed, etc. June 12, 1928: Patient has no discharge and middle ear is totally epithelialized over. Hearing: Rear, C-c_5; whispered voice, 15 feet; spoken voice, 35 feet.

TABLE OF RESPONSES TO OCULO-VESTIBULAR PAST-POINTING TESTS IN THE COURSE OF PROGRESS OF CASE 1.

Arm	Eyes Closed and Rotated to	Past-Pointing to
March 18, 1926:		
Right	Right	Absent
Right	Left	Absent
Left	Left	Left
Left	Right	Absent
March 15, 1927:		
Right	Right	Right
Right	Left	Right
Left	Left	Right
Left	Right	Right
March 29, 1927:		
Right	Right	Absent
Right	Left	Absent
Left	Left	Left
Left	Right	Absent
June 1, 1928:		
Right	Right	Right
Right	Left.	Absent
Left	Left	Left
Left	Right	Absent

At all times the past-pointing reactions constituted a more delicate and, to the patient, pleasanter test than either the rotatory or caloric; and it seemed to be more indicative of vestibular response to stimulation than are the latter irritative tests.

In practically all cases of chronic progressive deafness examined by the writer, there have been found changes in oculo-vestibular past-pointing reactions, even when significant changes in rotation and caloric tests were absent. In these cases also, it has been found possible to distinguish between chronic quiescent processes, with depressed vestibular function, and active cases with irritation of vestibular structures. It has been noted that definite changes take place in these reactions in the cases under treatment or in the progress of the disease, more or less paralleling the changes in hearing. Studies along these lines are being continued. The responses are also more

definitely lateralized than are the rotatory tests. The vestibular responses may be altered, as are the auditory, by the administration of vasodilators and vasoconstrictors. It might very well be that the early and more delicate disturbances in vestibular functions in C.P.D. are the result of disturbed local circulation.

The reversal of the vestibular head reactions of the lower mammals, in the form of past-pointing on turning of the head to one side or the other, has been noted in several cases, where involvement of the medulla and its nerves and tracts were quite obvious. In these cases, there is usually a disturbance of the oculo-vestibular reaction. This is shown in the following case:

Case 2: J. E., admitted April 27, 1928. C.C. ptosis of right eyelid and deafness of right ear. Past history: Lues in 1920. Treatment: 15 salvarsan and 20 mercury or bismuth injections.

Present history: Gradual onset over a period of two months prior to admission.

Physical examination: General examination of no special interest. Neurologic examination: Ptosis of right eyelid. Palsy of right superior, internal and inferior rectus muscles and of superior oblique. Right pupil dilated and fixed. Right facial palsy not involving forehead. Right subtotal deafness. Right hypoglossal paralysis; tongue deviates to right. Weakness of muscles on right side of neck. No palatal involvement. Vestibular findings noted below.

Deep reflexes unaltered: Wassermann, 2 plus. Diagnosis: Luetic basilar meningitis. Treatment: Alternating administration of bismuth and salvarsan.

May 17, 1928: Right internal and external ophthalmoplegia in a large measure cleared up. At rest, right eye squints to right, though patient can attain normal conjugate movements by effort which results in widening of right palpebral fissure. Diplopia present on looking to left. Ptosis is intermittent. Facial paralysis is also markedly diminished. Tongue still deviates to right. Hearing: Watch test, R., 4/6; L., 6/6.

May 22: Alternate squint at times; during greater part of period of examination squint is absent.

May 25: Hearing normal in both ears. Rotation gives normal nystagmus and vertigo, but no past-pointing.

June 5: Normal eye movements, excepting nystagmoid movements on turning eyes to extreme right. Facial palsy cleared up.

June 7: Left eye atropinized, shows slight squint to right. Bilateral exophoria. Tongue protrudes in midline, but tip deflects to left.

TABLE OF RESPONSES TO OCULO-VESTIBULAR PAST-POINTING TESTS IN THE COURSE OF PROGRESS OF CASE 2.

May 1, 1928:

Arm	Eyes Closed and Turned to	Past Points to
Right	Left	Absent
Right	Right	Right
Left	Right	Right
Left	Left	Left

May 3, 1928:

Right	Left	Right widely
Right	Ahead	Right
Right	Left	Left or touches
Left	Right	Left
Left	Ahead	Right or touches
Left	Left	Right

May 17, 1928:

Right	Right	Absent
Right	Left	Right
Right	Ahead	Absent
Left	Left	Right x
Left	Right	Right xxx
Left	Ahead	Right xx

May 22, 1928:

Right	Right	Left
Right	Left	Right
Right	Ahead	Absent
Left	Right	Right
Left	Left	Left
Left	Ahead	Absent

June 7, 1928:

Right	Right	Left or touches
Right	Left	Right
Right	Ahead	Absent
Left	Left	Absent
Left	Right	Left widely
Left	Ahead	Absent

HEAD PAST-POINTING REACTIONS.

June 5, 1928:

Arm	Eyes Closed and Head Turned to	Points to
Right	Right	Left widely
Right	Left	Absent
Left	Left	Absent
Left	Right	Left widely

June 7, 1928:

Right	Right	Left
Right	Left	Right
Left	Left	Right slightly
Left	Right	Left

I record these findings but make no attempt to interpret them. They are of special interest in that they indicate first, that past-pointing may be due to disturbances in the eye musculation, in the presence of normal response to rotation test as regards nystagmus and vertigo, and second, the existence pathologically of a head position past-pointing reaction.

In testing for oculo-vestibular reactions certain precautions must be observed. First, the head must not be turned in making the test, but only the eyes. Second, the effect of training resulting from repeated, successive testing must be avoided or misleading results will be obtained. Third, the patient must not turn or close the eyes until after the pointing arm has been raised from the objective. Fourth, the eyes must not be turned until after they are closed.

With regard to the nature of etiology of chronic progressive deafness, many diverse views are held. Attempts have been made to attribute all of these cases to a single etiology, without any signal success. With the exception of the cases of primary lesions of the central nerve tracts and nucles, and of the auditory nerve, one bit of pathology seems to characterize chronic progressive deafness, *i. e.*, interference with the normal blood and lymphatic supply and drainage of the inner ear, either primary, organic or vasomotor, or secondary to other changes in the ear and in the cranial cavity. It is but natural that the vascularization of the dense bony capsule of the labyrinth and its contained soft parts admits of little elasticity in blood supply, other than that permitted by the soft parts, the sheaths of the vessels and the lymphatic ducts and their circulation. On the other hand, the work of Denjiro Nabeya[7] has revealed that in the circulation of the human cochlea, the labyrinthine artery is in its major part a terminal circulation, anastomotic and compensatory circulation being possible only in a limited portion of cochlear scale (probably that portion corresponding to the C3-C4 range), and even that may be absent. The writer prefers to classify his cases as follows:

A. Intracranial origin. *1.* Lesions of the brain center or of the auditory tracts. *2.* Primary neuritis or atrophy of the auditory nerve. *3.* Increased intracranial pressure with choking of the auditory nerve and disturbances of the cochlear vascularization. These cases are often overlooked in the early stages and classified as chronic progressive deafness. Unilateral marked deafness should lead one to suspect it. Back pressure on the venous and lymphatic return seems to be the cause of deafness in these cases. The writer can confirm Gottlieb's[8] observation of eye changes in some cases of C.P.D. But none of these cases are free of suspicion of primary

cerebral involvement. On the other hand, especially in infants with lowered cerebral check influences, as well as in some adults, nervous changes pointing to irritation of the thalamic nuclei may complicate labyrinthine diseases, in which cases there is to be found tremors, exaggeration of extensor reflexes and affective disturbances.

B. Venous back pressure in the ear due to obstruction of venous return from head (Wittmaack).

C. Otic origin.

1. Traumatic. Direct injury to auditory structure giving rise to hemorrhage and to progressive deafness by interference with blood supply.

a. Birth injuries[9] incident to molding of the head create changes which are a predisposing factor.

b. Contusions and fractures of the skull.

2. Toxic.

b. Exotoxins such as salicylates and quinine. In the case of the eye, we know that the sudden toxic dist bances from these drugs take the form of vascular spasm due to these drugs, which if sufficiently persistent, may end in nerve atrophy. By analogy it would seem that the same process of vascular spasm is accountable for the toxic manifestation in the ear resulting from exhibition of these drugs.

b. Endotoxins such as the products of intestinal putrefaction, of infective processes in the body, etc.

3. Metabolic; such as disturbances in the purin[11] and lipoid metabolism. The evaluation of disturbances of calcium metabolism in relation to C.P.D. is difficult. Recent experimental work by Barlow[12] indicates that marked disturbances in calcium metabolism may result in no affection of the hearing or change in the amount of calcium in the labyrinth capsule.

4. Endocrinal. The most thoroughly studied of these are the thyroid disturbances, especially myxedema and cretinism. From our knowledge of the pathology of these two conditions in the ear and in other parts of the body, proliferation of myxoid tissue and narrowing of the vascular bed characterize the pathology of the condition.

5. Infective processes of the ear, either initially or secondarily, involve the blood vessels and vascular bed. Primary infections of the labyrinth are comparatively rare.

Secondary involvement is the more usual. Acute infections of the labyrinth may be considered as seldom in question in the causation of chronic progressive deafness. The subacute and chronic infections are more apt to be the causative factor.

Direct extension from a chronic suppurating otitis media frequently causes loss of hearing of the chronic progressive type. Curiously enough, it is in these cases that the author obtains the best responses to therapy, as regards to hearing. Extension of infection from the meninges and the intracranial structures constitutes one of the sources of infection of least prognostic promise.

Of the forms of labyrinthine pathology due to infection of the subacute or acute septicemic type, syphilis constitutes one of the most interesting and important. The nature of the pathology of syphilis, periarteritis, involving a terminal circulation, such as that of the inner ear, means acute narrowing of the vascular bed. The vascular changes referred to in the earlier part of the paper, which the writer has found with great regularity in the external ear in syphilis, may be regarded as constituting a superficial expression of the changes occurring throughout the ear structures, as well as in the brain and in all other parts of the body. They often occur comparatively early in the primary or in the secondary stage, being an expression of the early treponema septicemia, which is known to occur in syphilis. This involvement of terminal arteries in a syphilitic infection must be regarded as a permanent affair, for the involvement of the vessels creates a vicious circle; medication fails to reach the terminal, involved tissues, because of narrowing of the vessels, and the inability of the medicine to penetrate must result in a continuance of the process and permanent damage. The writer feels certain that a careful study of syphilitic involvement in tissues supplied by a terminal circulation will reveal the futility of ordinary methods of antiluetic treatment directed at them. With evidence which is as yet insufficient, he feels confident that the essential difference between the pathology of secondary and tertiary syphilis is an intensely narrowed vascular bed of the structures involved, rather than the hitherto assumed but unproven hypotheses of allergy.

The process of vascular narrowing begins with the primary and secondary stage. It is hard to believe, as some pathologists and syphilologists would have us believe, that the primary and secondary lesions of syphilis rarely result in scarring and permanent damage to the endothelial and advential membranes of the vessels. It is far more probable in view of the prolonged nature of syphilitic inflammatory process that an initial slight, but permanent damage is done in vasa vasorum, which progresses more or less slowly even after the secondary manifestations subside. Studies along these lines are being made. At any rate, in a large number of cases, observed over a period of years, the vascular changes above described as occurring in the external ear in cases of syphilis, did not clear up under anti-

luetic treatment, even when the Wassermann and spinal fluid and general condition of the patient became negative under treatment.

In this connection it is interesting to note that Professor Ruttin[13] has stated in a recent paper on congenital syphilis of the ear, "that the most varied and intensive therapy of these cases give little result. After variation of the hearing for a period of years, the hearing improved in no wise permanently after treatment; and in many cases the hearing was further impaired after treatment (including malarial therapy). In conclusion, one must say that our therapy in its present state does not affect improvement of syphilis in the cochlear apparatus. There seems to be no difference in results whether the Wassermann be positive or negative."

Dr. Gustave Alexander[14] in his paper on the histopathology of lues in the ear points out the frequency of vascular pathology. The sections shown by him, as well as those described by Wittmaack, show a widening of some vessels and a blocking of others, similar to those described in general paralysis of the insane. Alexander's conclusions as to early antisyphilitic and malaria treatment in otosclerosis are well directed. But it must be remembered that, first, in a large number of cases, ear conditions fail to respond to general antiluetic treatment, by a complete resolution of pathology, no matter how early it is begun, and, second, the danger of quinine to an already impaired auditory apparatus would seem to contraindicate the use of malaria, and would rather favor use of intermittent or rat-bite fever. In view of the favorable effects obtained by local therapy in impairment of hearing due to chronic suppurative otitis media, the writer is inclined to favor partial myringectomy, and local salvarsan powder, bismuth powder and iodine diluted with boric anhydride powder therapy in the middle ear, in lues of the ear,—therapy by the lymphatic route.

6. Neoplastic. Concerning neoplasms of the inner ear little is known, but they must be considered as a possible factor.

7. Vasomotor pathology similar to that of vasomotor rhinitis might be the underlying cause of chronic progressive deafness in some cases. At any rate, the marked changes in hearing from hour to hour, and day to day, in these cases, must be considered a manifestation of reflex vasomotor changes. It seems more reasonable to attribute the frequently beneficial effects observed with strychnin and pilocarpine therapy to changes in vascular tonus rather than in nerve tonus. The improvement frequentiy seen after administration of vasodilators, in some cases, and the vasoconstrictors, in other cases, is direct evidence of the importance of vascular changes in symptomatology of the disease.

8. Arteriosclerotic involvement of the inner ear undoubtedly explains some cases of C.P.D.

9. Lymphatic obstruction and stasis.

As regards the hereditary factor in chronic progressive deafness, two underlying bases of heredity might exist in the vascular supply of the inner ear. First, a congenitally narrow vascular bed in the inner ear. Second, accentuation of the terminal nature of the blood supply in the inner ear. It is interesting to note that Wittmaack has advanced the theory that venous stasis due to pressure by a widened carotid artery is the cause of otosclerotic bony pathology and experimentally he has succeeded in creating the bony changes of otosclerosis by tieing of venous sinuses in the rooster's ear. The bony, otosclerotic changes as well as the periosteal changes are in all probability secondary to vascular changes in many of the cases.

Conclusions: Gross vascular changes in the external auditory canal are described which resemble the vascular changes demonstrated in the pathology of chronic progressive deafness. These, coupled with the response of the auditory apparatus to vasodilator and vasoconstrictor drugs, are interpreted as indicating that the essential feature of the pathology of chronic progressive deafness is a disturbance in vascularity associated with changes in the vascular bed in the petrous bone—a hypothesis comparable to that of Wittmaack.

A delicate test of disturbances in the function of the vestibular apparatus in chronic progressive deafness and in other conditions is also presented—the oculo-vestibular past-pointing reaction.

An attempt is made to classify the various types of chronic progressive deafness on the basis of pathology, and to explain its hereditary nature, in many cases, on the basis of a congenitally narrow vascular bed in the labyrinth, and a nonanastomotic distribution of the labyrinthine artery.

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993 Park Avenue.

THE PREVENTION OF NASAL DEFORMITIES FOLLOWING SUBMUCOUS RESECTION OF THE NASAL SEPTUM.*

DR. WILLIAM WESLEY CARTER, New York.

It is now generally conceded that the submucous resection of the nasal septum is the best means for relieving obstruction to nasal breathing due to deflection of the septum. Since it has been shown by competent authorities that the septum is deviated in 75 per cent of Caucasian adults, and that in fully half of these the obstruction is sufficiently pronounced to call for surgical relief, it is certain that the demand for the operation is very great. In popularity it probably ranks next to tonsillectomy.

The framework of the nose is necessarily weakened by the submucous operation, but if the dangers are known and properly guarded against, and if the technical skill of the operator meets the requirements of this exacting little operation, the nose will be strong enough for all practical purposes and there should never be any clinical evidence of weakness. The submucous operation is a legitimate procedure, but it is one with distinct reservations.

The nasal arch is not dependent upon the septum for the preservation of its integrity, for it conforms to the architectural definition of the arch, in that it is a structure made up of an indefinite number of segments, assembled on a curved line in such a manner that extraneous support is necessary only at its two extremities.

The septum bears three very important relations to the nasal arch: *1*. The elevation of the nasal bridge and the development of a normal, symmetrical organ, is, to a large extent, dependent upon the influence during the years of active growth, of a healthy, well placed septum. *2*. The upper edge of the cartilaginous septum forms the keystone of the arch. *3*. The septum, as a vertical support, greatly strengthens the nasal arch.

The following is a quotation from a paper I read before the Academy of Medicine on April 26, 1906: "While I am convinced that the septum, as a vertical support, takes no part in the preservation of the contour of the nose, I am equally certain that it does play a most important part as one of the forces in the development of the symmetrical organ and therefore should not be removed during the years

*Read before New York Academy of Medicine, Section on Laryngology and Rhinology, Oct. 24, 1928.

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of active growth." In the same paper I also called attention to the importance of the upper edge of the cartilaginous septum as the keystone of the arch and warned against its displacement during the submucous operation. During the 22 years that have elapsed since this was written I have seen many cases of deformity due to the removal of the septum during early life, and others that were due to displacement of its upper edge. On Jan. 27, 1915, I demonstrated before the New York Academy of Medicine two typical cases of deformity following this operation.

I now feel that my warnings of the dangers attendant upon this procedure were fully justified.

The dynamics of nasal development are intimately associated with the growth of the septum, and should be well understood and duly respected by every operator: The earliest division between the nasal cavities is effected by the vomerine cartilage; this is chiefly a fetal structure, as only the anterior portion, which constitutes the cartilaginous septum, remains in adult life. The posterior portion is absorbed by the coalescence of the two bony plates that form in the membrane which covers either side of the vomerine cartilage and which when they are eventually united constitute the vomer. The osteogenetic centers make their appearance in the lower, posterior segment of this membrane on either side at the eighth week of fetal life; osteogenesis proceeds upwards and forwards; as these two plates of bone form, they gradually coalesce from behind forward and upward and the portion of the vomerine cartilage caught between them is absorbed and the vomer becomes a single plate of bone. Anteriorly, the two bony plates do not quite come together, leaving a gutter into which fits the septal cartilage. If, as sometimes happens, the two plates of the vomer do not completely coalesce, we have a double septum; the interval between the two plates may be filled with cartilage or there may be an air space. Incidentally, I may say that in doing a submucous operation on such a case, the operator should bear in mind a possible dehiscence in the cribriform plate with attendant danger of traumatism or infection of the meninges.

Now to return to the bearing which the removal of the septum in the growing child has upon the development of the nose: When the child is born the nose is flat and stubby. As he grows the proportion between the breadth of the base of the nose and its vertical diameter changes; the height of the arch increases much faster than the breadth of the base. Now, what brings about this change? It is perfectly plain that it is due to unequal growth of the related parts of the framework of the nose. The inherent power of growth is greater in the septum than it is in any other parts of the nasal frame-

work, therefore the normal septum, placed in a vertical plane, raises the nasal bridge in much the same manner as a tent pole performs its function of raising and supporting the ridge pole of the tent. That this function of the septum is real and that the obligation imposed upon it is onerous, is abundantly testified to by the frequency with which deviated septa are encountered in Caucasian adults, who normally have high nasal bridges. Conversely, in the negro and mongolian races, whose flattened nasal bridges approximate the infantile type, deviated septa are rarely found. I have been told by Southern rhinologists of large experience that they did not recall ever having seen a deviated septum in a full-blooded negro. This immunity from septal deviations can be accounted for only upon the assumption that in this race the extraordinary power of growth of the septum does not exist, but that it is a characteristic of the Caucasian race.

When we consider the above etiological, anatomical and clinical evidence of the influence of the septum in the development of the nose and the maintenance of its normal elevation, there is no need for further emphasis upon the importance of preserving the septum in the young and safeguarding the position of its upper edge, which constitutes the keystone of the arch in the fully developed nose.

In the case of children suffering from nasal obstruction caused by deviation of the septum, we are confronted by a problem demanding very careful deliberation. Here we must decide whether it is better to operate or to wait, it may be for several years, until the developmental period has passed. Our decision will rest here largely upon the extent of the obstruction and the condition of the septum; if this is badly crumpled, it will not perform the function of elevating the bridge anyway and should be operated upon.

There are some cases, and I am sure that all of you have met them, where relief from the obstruction caused by a deviated septum must be afforded the child at once; these admit of no argument and may be operated upon by a method which I shall describe and which I believe is attended by minimum danger to the future development of the nose.

There are other children whose nasal septa are deflected, who have more or less obstruction, and who have become elective mouth-breathers. In these there are no urgent symptoms and the thought of an operation must refer chiefly to future benefits. Here our judgment requires the finest discrimination and a study of the case must be carefully made.

In the first group of cases the septum, as a rule, has been so badly crumpled up by a severe traumatic injury that the prospect of saving all of it and lining it up in a vertical position is very doubtful.

Relief, however, may be considered imperative and we are forced to intervene, for we realize that even if the septum is left in its crumpled state, a deformity will result anyway. A crumpled septum will not perform the function of raising the nasal bridge, for it can exert no vertical pressure.

The submucous operation upon a patient under 18 years of age is an entirely different proposition from that upon an adult. The keynote of every move in the operation upon the child must be conservation of tissue. It is better to err by saving too much of the septum than to remove too much. A slight obstruction to nasal breathing up to adult life, when it can usually be corrected, is preferable to the development of a broad, flat nose, which may be obstructed also and which we know is prone to rhinopharyngitis atrophica.

Incidentally, I may say that the occasion for the submucous operation on the child, and the adult as well, would in many cases be averted if a thorough examination is made at the time of injury by an experienced man, and the fractured parts carefully set and held in position by the bridge-splint which I devised and presented before the New York Academy of Medicine a number of years ago, and with which you no doubt are familiar. The lines of force exerted by this instrument enable one to bring the fractured segments of the nasal arch back into perfect alignment, and there is no interference with the development of the nose.

Our chief concern here, however, is with those traumatic cases under 14 years of age that were not properly treated at the time of the injury and that have healed with crumpled septa, which cause more or less complete obstruction. Even if no deformity has yet developed, these patients are certain to have, when adult life is reached, a broad, flat, stubby nose, subject to atrophic rhinitis. We feel that we must do something for them.

It must be assumed that the description of one's operative technique is subject to the modifications which the surgeon finds he must make in the course of his work, for seldom are two cases alike, and the ability on the part of the operator to recognize these differences and meet contingencies as they arise is, to a large extent, a measure of his experience and the efficiency of his methods.

A brief recital of the salient points in a case that came under my observation recently will indicate my methods in dealing with septal deviations in patients under 18 years of age: A boy, age 12 years, having a slight twist to the nose and a deflected septum that completely blocked the left nasal passage, came to me for relief. The obstruction followed an injury to the nose two years before, and for which he had received no proper treatment at the time.

Operation: I elevated the mucous membrane on the convex side only. I then made several crisscross incisions through the cartilage, but not through the mucous membrane on the opposite side. I took care to destroy completely the resiliency of the cartilage. To prevent overlapping, I removed a very narrow strip of cartilage near the apex of the deflection. I then inserted two gold-wire splints, moulded at the time to fit the nasal cavities. These held the septum in a vertical plane, and at the same time did not interfere with the patient's breathing through his nose. They were removed in a week.

The septum has remained straight and the obstruction has been relieved. I believe that the development of the nose will not be interfered with, as the several fragments of cartilage, connected as they still are with the mucous membrane of one side, still have the inherent power of growth.

The prevention of nasal deformities in *adults* after resection of the septum, must be viewed from a different angle. Here the developmental force of the septum has been expended and only its two mechanical functions remain, namely, as a segment of the arch and as a vertical support to this structure. Both of these functions must be conserved if a deformity is to be avoided.

In removing the cartilage, one should be careful not to make any drag on the upper edge of the septum; for this reason I consider the swivel-knife unsafe and have always advocated the use of punch-forceps for this purpose. My model, which is the first instrument devised for the submucous removal of the septum, is used without a speculum, and with it one has the advantage of being able to remove the obstructing portions of the septum under the direct guidance of the eye, without making the slightest drag on the dorsal segment.

If we select for removal, only those portions of the septum that are causing obstruction, we may not leave a perfectly smooth, vertical septum, but this is not always essential to a good breathing space, and it is far wiser to conserve the strength of the nasal arch than to sacrifice this in an attempt to attain intranasal cosmetic perfection.

The dorsal segment of cartilage should be left as wide as possible and great care should be taken not to displace its upper edge. If the desired result can be secured, it is advisable to punch out the cartilage in such a manner that the lower edge of the dorsal segment will be an arch, with an ample margin of tissue at the junction of the bony and cartilaginous bridge and preservation of the anterior margin of the quadrangular cartilage. The latter is attached to the anterior nasal spine and is an important prop to the nasal tip.

If the anterior nasal spine is causing obstruction, it should be pared, but not removed in its entirety, because it is the basic attach-

ment for the anterior end of the quadrangular cartilage and also because its complete removal obliterates the normal curve between the septum and the lip.

The columnar cartilages are not necessary to the support of the nasal tip, so dislocated, obstructing portions of these may be removed with impunity.

It is unnecessary for me to mention before this audience that infection should be most carefully guarded against, for you all know that if infection occurs and it is not recognized early and eliminated quickly, the upper segment of the septum will be destroyed and a saddleback deformity is certain to follow.

Hematoma should be regarded as a potential abscess and treated accordingly. If infection does occur, the best treatment is to evacuate the pus or blood and swab out the sac with carbolic acid, followed by alcohol.

In conclusion, let me say: *1.* All injuries to the nose should receive prompt attention and the fractured and dislocated parts should be placed in alignment by means of the *bridge-splint.*

2. The submucous operation, save as an emergency measure, should not be performed before the eighteenth year.

3. When the submucous operation *is* performed, whether the patient be a child or adult, conservation of tissue should be the keynote.

4. The septum should be removed by means of punch-forceps and great care should be taken not to dislodge the upper edge of the cartilaginous septum.

5. Correction of deformities resulting from the submucous operation can be corrected only by the autoplastic transplantation of bone, cartilage or conjoined bone and cartilage. This operation was originally described by me many years ago, and I am quite sure that all of you are familiar with its technical details.

Before closing, I feel that you will pardon the implication I make when I say that many of the cases of nasal deformity following the submucous operation that have come under my observation bore unmistakable evidence of unskillful work on the part of the operator, and I may venture the suggestion that the surgeon who would master the submucous operation must develop a perfect technique, must have manual dexterity, and he must be endowed with at least a modicum of that heaven-given attribute vaguely expressed as the *"tactus eruditus".*

2 East 54th Street.

International Digest of Current Otolaryngology

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Mr. W. S. Daggett, London.

It is with great pleasure that the management of The Laryngoscope announces the inauguration of this new department. Our chief purpose is to establish and maintain a better national and international relationship in Otolaryngology as well as to briefly keep our readers acquainted with current scientific progress in the specialty.

A collaborating staff has been selected but this should not deter colleagues from submitting items which they consider of sufficient importance and interest. We are most anxious to build this column into a current blotter of interest to Otolaryngologists throughout the world.

CENTRAL INSTITUTE FOR THE DEAF.

The cornerstone of the new building was laid on Tuesday, Sept. 25, 1928, by Dr. Max A. Goldstein, Director of the Institute.

Central Institute for the Deaf was established through the efforts of Dr. Goldstein, in 1914, with two teachers and three pupils. Its present capacity is 125 pupils and 25 teachers, while the new building will be able to care for 350 pupils.

The new building will also have modern laboratory facilities, gymnasium, auditorium for 500 and a roof playground. The building will be ready for occupancy in June.

PHYSICIANS GOING TO VIENNA.

All American physicians planning a trip to Vienna for post-graduate study should so notify the Secretary of the American Medical Association, of Vienna, VIII Alserstrasse 9, in order to facilitate the rebate of the Austrian visa fee on their arrival in Vienna. This rebate courtesy of the Austrian Government is made only in Vienna at the time of registration with the American Medical Association of Vienna.

FIRST INTERNATIONAL OTOLARYNGOLOGICAL CONGRESS.

The first International Otolaryngological Congress since 1912 was held in Copenhagen from July 30 to August 1, 1928.

There were 400 specialists present, representing the various countries and nations.

More than 120 papers were read during the three-day session.

There were seven invited reference works on the program which were fully discussed by the Congress.

UFFENORDE, of Marburg, presented a most interesting paper on "Septicemia of Pharyngeal Origin", in which the question of all infections arising in the neck and pharynx was considered, with particular emphasis on the pathology and bacteriology. He lays great stress on the lymphatic spread of sepsis from the pharynx.

FERRERI, of Rome, contributed a paper on the same subject but his paper was based more on a tonsillar origin of the infection and was discussed from this view.

H. NEUMANN, of Vienna, presented a paper on "Conservative Radical Operation in Chronic Middle Ear Disease". He discussed the pros and cons of it as compared to the full radical operation. Its main advantages are retention of any remnants of hearing and better healing while the leaving of the ossicles and remains of drum membrane may be leaving one of the main foci of chronic infection.

MOURAT, of Montpelier, and PORTMANN, of Bordeaux, presented a paper on "Anatomical Structure of the Middle Ear and Its Relation to the Course of Middle Ear Suppuration". They go into the normal and abnormal development of the various bones forming the middle ear, pointing out clinical manifestations of a suppuration which may be dependent on the development. They also go into the question of degree of pneumatization of the mastoid process and the effect this might have on the production and course of a mastoiditis.

WITTMAACK'S (Hamburg) paper on the same subject, "Anatomy and Middle Ear Suppuration", was discussed, although Prof. Wittmaack was not present at the Congress to enter the discussion. The paper is a resume of Wittmaack's numerous contributions to the literature on pneumatization theories, cholesteatoma formation and theory of what sclerotic mastoids are the result of. He believes that thickened middle ear mucous membrane and a sclerotic mastoid are the causes, rather than the effects, of a chronic middle ear suppuration. He also believes that various constitutional components are the deciding factors in whether or not a mastoid process is sclerotic or pneumatic.

DAN MACKENZIE, of London, presented a paper on "The Treatment of Cancer of Pharynx, Larynx and Esophagus by Surgical Diathermy". He discussed the operations in these parts which are to be treated by diathermy. Eradicable cancer of the tonsils, palate, epiglottis, glands of the neck,—can all be surgically handled with diathermy, with the advantage of sealing the lymphatic channels against the spread of cancer cells. In cases of ineradicable cancer of these parts, diathermy may be used to keep the disease from spreading. He then compared the use of diathermy to radium and deep X-ray therapy.

GUNNAR HOLMGREN, of Stockholm, presented a paper on the same subject as Dr. Mackenzie, but confined himself to reporting on the development and history of diathermy, on technique of use, results and prognosis.

For the 120 other interesting papers presented to the Congress, the reader is referred to the full report of the Congress which is due to be published shortly. A brief mention of only a few is made in this column.

E. LUSCHER, of Bern, described an Oto-Microscope which magnified 10-20 times. He claims that the minute structures of the drum become clear on ordinary otoscopy with the use of his instrument. Defects are easily recognized and cholesteatomatous formation seen without difficulty.

ARTHUR SCHULLER, of Vienna showed some most interesting Roentgen plates of anomalies of the pharynx.

MAX GOLDSTEIN, of St. Louis, reported on research work which correlated the various sense-organs. The physiology presented was interesting from the utilization of other sense-organs in the education of the deaf child.

BARANY, of Upsala, discussed the physiology of otitic nystagmus and showed that the superimposition of a nystagmus on an already existing one tended to inhibit the original nystagmus.

DUEL, of New York, discussed the outlook for the solution of the otosclerosis problem and reported on the progress being made by the committee in the United States. He advocated co-operative national research on the subject to avoid duplication of the same efforts.

WATSON-WILLIAMS, of London, read an interesting paper on "The Question of Sinus Sepsis as a Cause of Insanity". He has observed several cases over a long period of time and concludes that there is a very definite relationship between chronic sinusitis and some forms of insanity.

HAJEK, of Vienna, presented his principles for the treatment of frontal sinus infection. He urged conservative endo-nasal treatment in all cases before external radical operation unless there is an immediate danger to life which calls for radical surgical intervention.

OSKAR HIRSCH, of Vienna, corroborated his earlier surgical work on tumors of the hypophysis and reported that his operated cured cases are still doing well.

Voss, of Frankfurt a/M, presented a paper on "The Effect of Trauma on the Auricle as Seen in Prize-Fighters". On section of such auricles one sees small cysts in the scar-tissue which give the auricles their peculiar shape.

WESSELY, of Vienna, showed two short motion picture films of the drum membrane, one showing respiratory movements due to abnormally wide Eustachian tube, and the other showing marked pulsation in the drum due to an abnormal blood vessel passing through it.

SIR ST. CLAIR THOMSON, of London, presented a report of 70 cases of laryngo-fissure in intrinsic cancer of the larynx. He discussed the value of impaired motility of the affected cord in the diagnosis and prognosis.

MITHOEFER, of Cincinnati, presented a paper on latent antritis, which appears in full in this issue of THE LARYNGOSCOPE.

DEPARTMENT OF OTOLARYNGOLOGY,
MEDICAL SCHOOL, WASHINGTON UNIVERSITY, ST. LOUIS.

From 1890 to 1922 Dr. John B. Shapleigh was Director of the Department of Otology of the Medical School of Washington University. From 1906 to 1922 Dr. Greenfield Sluder was Director of Laryngology and Rhinology, and from 1922 to 1928 he was head of the Department of Otolaryngology. From 1914 to 1928 the otolaryngological work was done in St. Louis Children's Hospital, in the City Hospital, and in the Washington University Dispensary. There were no special laboratories for the otolaryngological work.

A most excellent department for the teaching of graduate and undergraduate otolaryngology was created. The excellent research work of Dr. Sluder indicates the scientific spirit which was present in the staff. The contributions to otolaryngology by other members of the staff have received with recognition. It was indeed unfortunate that the facilities for the creation of a department with extensive laboratory background should have become available just at the time when Dr. Sluder's poor health and death deprived the department of his services.

A short time before this, Mrs. William McMillan bequeathed to the Medical School $1,200,000 to be used for the building of a hos-

pital for work in ophthalmology and otolaryngology. It is planned with the completion of this hospital to add to the Department of Otolaryngology, laboratory teaching and research so that the dreams for the development of the department will be realized. It is contemplated that the new building will have devoted to the clinical side of ophthalmology and otolaryngology, six floors, and that there shall be three floors utilized for the laboratory teaching of these subjects and for research.

With the increase in the executive duties of the head of the department it seemed advisable to the Executive Faculty of the Medical School to make this position a full time one. Dr. L. W. Dean, formerly Professor and Head of the Department of Otolaryngology of the Medical School of Iowa State University, was appointed Professor of Otolaryngology and executive head of the department. There will be added to the staff of the department other full time persons; especially physicists, pathologists, biochemists and bacteriologists, who will develop the special phase of the subjects as related to otolaryngology.

The present clinical staff will remain on a part time basis, and there will be no change in those things which have been so well developed.

The plans are for clinical service in Barnes Hospital, in St. Louis Children's Hospital, in the City Hospital, and added to this the clinical service in McMillan Hospital, with additional personnel and laboratory service which will be the result of recent grants.

There will be a one year's graduate course in otolaryngology. Excellent opportunity will be offered to the special student interested in research. Review courses will be available to otolaryngologists already established in practice.

DISCUSSION ON MENINGITIS.

(Royal Soc. Med., July 12, 1928.)

Mr. Jenkins, having grouped cases into those in which the organisms had not reached the subarachnoid space, and those in which this space was invaded, stated that it was dangerous to regard any but the earliest cases as belonging to the first group. In fortunate cases clearing the infecting focus was followed by recovery. He treated doubtful cases as for the more dangerous condition and regarded diagnostic lumbar puncture as a dangerous procedure, which was apt to spread infection. He had had encouraging results at King's College Hospital after washing a modified Locke's solution through the subarachnoid space from a lumbar puncture needle to the infecting focus. The following is a resume of technique in a case of meningitis following labyrinthitis:

1. Anesthetic, ether only; no morphia or atropin.

2. Lumbar puncture, slow withdrawal of a few c.c. sent to pathologist for immediate report.

3. Radical operation, superior and inferior labyronthotomy, complete *cleansing of cavity.*

4. Opening through vestibule into subarachnoid space of internal auditory meatus, a wick of twisted silkworm gut entered into this space.

5. Modified Locke's solution run through lumbar puncture needle and out via wick from a height of about 2 feet.

6. A suspension of 5 grs. of iodoform in 20 c.c. of horse serum introduced and washed through with more solution.

7. Needle removed and wick left in for continuous drainage.

In the discussion many surgeons argued against the procedure but it appeared that nobody had tried it in detail. Many of those present also condemned diagnostic lumbar puncture.

THE OTOMETER.

(Shown at Otological Section, Roy. Soc. Med., by Mr. O. Popper.)

Mr. Popper demonstrated an electrical instrument designed to measure accurately the range and sensitivity of hearing. The source of sound is a complicated circuit of vacuum tubes so arranged as to produce continuously pure tones; these are delivered through a loud speaker. The intensity of these tones can be varied at will and the input of current measured. This latter, at the "Threshold of Audibility", serves as an index of the patient's hearing capacity for that particular note. Mr. Popper pointed out that sources of error when using the tuning fork are well known and claimed that his instrument can be made "foolproof", though it was at present expensive and difficult to assemble.

DONATH reports (Gyogyaszat, 1928, 1085) that he was able to arrive at some nice results in stutterers by the use of hypnosis therapy. One of the special advantages is that in most cases where the history of the cause of stuttering is not definitely established a hypnotic session very often can bring to light the cause. He reports also that persuasion psychotherapy (Dubois) can be used to good advantage at the same time.

L. DENES, in the meeting of the Laryngological Section of the Budapest Medical Society, reported that exercise therapy was of great use in the cure of recurrent paralysis. Some new work on this same subject has also been done by G. Barczy. The value of vocal and consonant exercises can be established by repeated X-ray pictures.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION OF LARYNGOLOGY AND RHINOLOGY.

Meeting of October 24, 1928.

Carcinoma of the Orbit and Ethmoid Removed by Surgical Diathermy.

Dr. M. C. Myerson.

This patient is presented to show what we can hope to accomplish with surgical diathermy in extensive invasion of structures about the head by cancer. Barnes has demonstrated the feasibility of attacking extensive malignant disease of the accessory sinuses and it is the aim of the writer to interest and stimulate those who come in contact with such cases to attempt to cure them, rather than consign them to the uncertain results that radium has to offer or continued suffering and death.

This patient, a man age 58 years, had his right lower lid operated upon for lupus 22 years ago. A little over a year ago he presented himself at a hospital because of blindness of the right eye, pain in and around the orbit and a tumor formation in the region of the inner canthus, which seemed to extend into the orbit. A section of tissue was taken from this area and a diagnosis of epithelioma was made.

The patient was first seen on the Eye Service at the Kings County Hospital in May, 1928. At that time his right eye had not been functioning for over a year and the contents of the orbit presented a distorted mass. He was suffering excruciating pain in and around the eye. He had received five radium treatments before the time of his admission. He also complained of a stuffiness of the right side of the nose.

Examination of the nose disclosed a septum deviated to the right and a mucoprulent discharge coming from the middle meatus. X-ray study revealed an opacity of the right ethmoid region and evidence of chronic disease of the maxillary sinus of the same side. One could not differentiate between a long-standing suppurative ethmoiditis or a malignancy of moderate extent.

Dr. Meehle, of the Eye Service, was kind enough to remove as much of the orbital content as he could surgically. Following this, I applied the diathermic electrode to the remaining structures of the orbit and followed the infiltrative process as far as it went. The neoplasm took me into the ethmoid region, where by a process of coagulation the entire ethmoid labyrinth was exenterated. The sphenoidal cavity was also entered. There was no difficulty in penetrating the thin bone of the ethmoidal septa with the electrode. After the slough came away and the wound healed, it was found that the entire middle turbinate had been retained and the extent of the sphenoethmoid operation could be made out. It was found also that part of the roof of the antrum had been removed, although this was not known until some small sequestra had been removed which left a space in the roof of the antrum.

One cannot tell just how much or how little tissue he will remove in this region with the diathermic electrode, for there is destruction of bone which does not make itself known to the operator until weeks have passed. For this reason the cribriform plate should be respected more during an electrothermic coagulation than during the usual surgery of the ethmoid and sphenoid.

The result is thus far satisfactory. The patient lost his headaches immediately after his reaction from the operation. There has been no evidence of recurrence since.

DISCUSSION.

DR. HURD: I would like to know how much bone was encountered.

DR. MYERSON: I knew that I encountered bone by the feel and the reaction of the pressure to my needle. I destroyed considerable bone. As can be seen, there is a rim of dead bone, and a good deal of it sequestered only recently. The operation was done in June, and only a couple of weeks ago I removed a sequestrum.

I might add, in closing, that when the electrothermic current is used on soft tissues, such as the tongue, for instance, one must be on guard for secondary bleeding when the slough comes away. I encountered severe arterial hemorrhage in two cases of partial glossectomy on the tenth day after operation. For this reason the patient should be kept in the hospital or in some place where he can be properly cared for in case of need.

DR. D. H. JONES: I was in Stockholm last summer and Dr. Holmgren showed 25 cases of carcinoma of the superior maxillary treated by diathermy. They are far ahead of us in surgical diathermy.

I would like to know what anesthesia was used in this case.

DR. MYERSON: Chloroform anesthesia was employed.

Case for Diagnosis. Dr. Francis W. White.

G. T., a man age 62 years, came to Dr. McCullagh's Clinic at the Manhattan Eye, Ear and Throat Hospital complaining of sore throat of three weeks' duration. The right tonsil was somewhat ulcerated, and he had very bad teeth.

Smears from the throat showed mixed forms of bacteria, few fusiform bacilli and spirochete of Vincent. A provisional diagnosis of Vincent's angina was made. A few days later the report on the blood fixation test was: Wassermann four plus, Kahn four plus, and salvarsan and mixed treatment was instituted.

The patient returned to the clinic some time later and it was seen that the right tonsil was more ulcerated, despite the treatment. A specimen was removed from the edge of the ulcerated area for microscopic examination. The report stated that numerous micro-organisms were present, with hyperplasia and infiltration, and pearl formation.

Diagnosis: Squamous cell epithelioma.

Yesterday, we tried a new preparation which Dr. Jones brought back from Budapest—a hyperperoxid tablet. The report on the smears taken this morning came back positive.

The question is, shall we continue with the treatment of the Vincent's angina, plus the syphilitic condition, plus the ulceration on the right tonsil? Shall we temporize or go in and remove the tonsil? The glands are not particularly enlarged; his age must be considered; he is still blood Kahn positive, still has Vincent's organisms, and manifestly, still has the new formation in the right tonsil.

The patient is presented not so much for diagnosis as for suggestions for treatment.

DISCUSSION.

DR. HARMON SMITH: In my opinion it is inadvisable to attempt any surgical procedure until the syphilitic element has been eleminated at least. As to the Vincent's angina, cleaning up the teeth and mucosa may get rid of that element. But there is no reason why because one has Vincent and a specific lesion he should not also have cancer. I recall a man seen some years ago with a specific involvement of the arytenoid cartilages from which he recovered, but in the course of time he developed cancer in the same locality from which he died. We do have these mixed infections frequently and we cannot tackle the major until we have eliminated the minor condition. In this instance the man has had salvarsan treatment, but the statement that he has also had mixed treatment is indefinite. The intake of mercury and potassium iodid is all-important, and until one has been thoroughly mercurialized there will be no beneficial indications evident, and then the administration of large doses of potassium iodid will eliminate the destructive elements from the mercury administered.

DR. LORE: We have been very much interested in this case. Dr. White is very modest in talking about the problem of diagnosis, but it is a problem. Often if you find Vincent's organisms and find a four plus Wassermann you stop there, and by the time you are wondering why the case does not get well, it has become inoperable. At any rate, the fact that following salvarsan treatment the condition did not respond to this therapy is of course important. It brought up the question of whether a definite diagnosis could be established to account for the persistence of the ulcerated area in the tonsil.

It was, therefore, deemed advisable to perform a biopsy. Specimen was removed from the edge of this area, with the result that the diagnosis was definitely established as a squamous-celled epithelioma. Therefore, here we have a case presenting a positive Vincent's angina, a four plus Wassermann and epithelioma. Salvarsan treatment has not cleared up the Vincent's infection. Present Wassermann reaction is negative, although the Kahn test is two plus. I feel that the procedure in treating this case from this point on should be as follows: Application of radium externally, local treatment of the ulcerated area by means of sodium perborate and hydrogen of peroxid, the continuance of the antispecific treatment and, depending upon the further course of the condition, to either insert radium needles in the tonsil involved or to attempt removal either by surgery or endothermy. Should it be decided to resort to surgical removal, then the exposure of the external carotid artery should first be performed. Should any glands be encountered on the way down to the external carotid, they should be removed.

Another thing is the presence of the spirochetes fusiform bacilli in a patient who has been treated with salvarsan. If salvarsan were a specific for these spirochetes, and some are inclined to believe that, the field should not be fertile for these organisms; and yet after these many injections of salvarsan we still find spirochetes. My impression is that salvarsan does not play a strong part in the elimination of Vincent's organism. This case has a tendency to confirm what I have always felt in these cases. These organisms being anaerobes, I would oxygenate them by using either sodium perborate or hydrogen peroxid locally.

DR. L. M. HURD: The important point that has been brought up is the fact that Vincent's angina superimposed on a syphilitic base does badly. Salvarsan does not seem to be effective in such cases, though salvarsan with Vincent free of lues does very well; with lues, it does not. I have had four deaths from Vincent's in lues patients. If this case is operated on I think you will have a foul wound, etc. The first thing to be done is to clean up the teeth where they harbor the organism and get rid of that, and then dissection of the neck, tie the external carotid, and probably a diathermy knife with coagulation would be the better procedure to remove the growth in the mouth. Unless the Vincent's infection is cleared up this probably will not take place until the necrotic gingivitis is cured, which means that some of the teeth will have to be extracted.

DR. WHITE: We are all probably agreed upon the form of treatment: first clear up the Vincent. It has been my habit, where there is a Vincent's organisms to have a Wassermann test made anyway; and I have come to the conclusion that there are three forms of treatment: the use of salvarsan either by injection or locally (this patient has had none locally, in the mouth); the perborate of sodium; or a combination of the two. I have seen many cases of Vincent's and have used everything recommended in the pharmacopeia for the condition.

The suggestion regarding diathermy is a very good one. I considered that, although I did not speak of it. We could easily block off with the needle a considerable area of lymphatics and many blood vessels. The other points are self-evident.

A New Type Needle for Intranasal Suturing. Dr. John M. Lore.

The suggestion of some of my friends who have seen this needle in use prompts me to present it to you for your kind consideration.

Some five years ago one of the post-graduate students at the Manhattan Eye, Ear and Throat Hospital asked me to repair a very extensive tear in the mucous membrane of the nasal septum. The tear was a considerable distance posteriorly. In attempting to suture the flaps, I found that I was unable to negotiate the turn with any of the needles available. After having broken them all, the nurse said she had no more, excepting a hypodermic needle. Taking this needle, I passed some fine horse hair through its lumen as far as the bevel. With this, it turned out to be a simple matter to perform the repair. That is how I came upon the idea of using this type needle for suturing in narrow, inaccessible places.

The needle that is being presented now is really nothing else but a spinal puncture needle curved to suit the particular needs of the nasal space. One end has an attachment so that it may be held easily. The needle is loaded by passing either horse hair or unmoistened catgut No. 0 through the lumen as far as the bevel. Passing the point of the needle through the edges of the flaps to be repaired, the suture material is then pushed out beyond the bevel, where it can be seen in the nostril. It is then a simple matter to grasp this end of the suture with a fine mosquito clamp or forceps and while holding it firmly, to withdraw the needle. Enough suture material is left distal to the tip of the needle to have it sufficiently long to use a slipknot.

Without any further intranasal manipulation the slipknot is slipped down to the points where the needle went through the flaps.

Where it becomes necessary to suture a flap from one side of the nasal septum to the one on the other side, it is comparatively simple with this needle.

This needle has been found very valuable in closing septal perforations of recent or long-standing.

Some of my colleagues have used this needle in tonsil work. There is no reason why it cannot be used in any small cavity.

This particular shape is not intended to apply to all problems of suturing—modifications suggest themselves, but shall leave them to those who may have some special problem to solve. All I wish to do is to leave the thought with you, that the lumen of a needle may be used in carrying or holding the suturing material. The motion pictures will illustrate how it is used.

Demonstrating Bronchoesophagoscope. Dr. Charles J. Imperatori.

This device consists in a two-vision telescopic attachment for the Jackson type of bronchoscope and esophagoscope. The direct telescopic view is obtained by the operator, simply by attaching the device to the proximal end of the bronchoscope or esophagoscope after the usual introduction of the endoscope. An individual focusing arrangement for the operator and observer is provided.

There is no magnification, distortion, nor inversion of the image. The operator has a direct view of the field, while the observer's view is through a prism. A collar on the attaching mechanism permits the observing telescope to be turned either to the right or left of the operator. In teaching and demonstrating, the use of this attachment is obvious.

Mr. Reinhold Wappler, of the American Cystoscope Makers, Inc., made this instrument for me.

The Prevention of Nasal Deformities Following Submucous Resection of the Nasal Septum. Dr. Wm. Wesley Carter.

(Published in full in this issue.)

DISCUSSION.

DR. HURD: Dr. Carter has been working on the question of these deformities for over 20 years and he has brought out two points well worth remembering. If you tear out the lateral cartilage you will have a certain amount of depression of the nose. Dr. Carter stated that the septum assisted in holding up the arch. I doubt if a deviated septum gives much support to the nasal arch if the arch is subjected to a blow sufficient to fracture the nasal bones. The fragile septum which is not deviated would not resist a force of even five pounds, therefore the nasal arch is practically as strong after a submucous resection as before. Beginning in 1905, I operated on a number of children with the idea that the nasal arch would grow without the septum. I have seen six in 10 who have grown up, and they have bulbous tips to their noses, but no depression, and their noses have not developed as their brothers' and sisters' noses have at the tip. I feel that it is better not to do it if you can help it. In some cases, however, you have to give them air space; the nose is full of polypoid material, and in order to give them air you have to operate. It is surprising how few cases of depression occur after submucous resection, considering the number of operations done.

DR. WESLEY C. BOWERS: To my mind, Dr. Carter's paper is very apropos. It would seem that recently many operators have overlooked the importance of

preserving the dorsal edge of the septal cartilage, and the dangers of dislocation of this structure through the use of improper instruments.

I would like to emphasize two points that Dr. Carter brought out. First, the importance of using a biting forceps for the removal of the cartilage, rather than the swivel knife. The swivel knife may dislocate the cartilage; a grasping forceps may dislocate or fracture it. Second, the inadvisability of removing an entire septum when only a portion of it is causing damage. With children, especially, I feel that the symptoms must be very severe to warrant any interference. It is frequently possible to remove a small piece of the septum in children without damage to the development of the nose; if more than a very small piece is removed deformity will surely result. In such cases as require considerable removal in order to accomplish the necessary results, it would be better to sacrifice a portion of a turbinate.

There is one deformity due to fracture, which I have seen a number of times in children under 10 years of age, which, I confess, should have something done to correct it, but just what, I am at a loss to know. I refer to those cases where the fracture completely occludes the vestibule on one side. If, in these cases, you remove even a portion of the obstruction, you will undoubtedly get a deformity; yet, if nothing is done, that side of the nose is entirely blocked and the usual train of nasal symptoms is liable to follow. I would very much like to hear the experience of others with this type of deformity.

DR. WHITE: The essayist has given the usual causes and forms of treatment for the subject under discussion. There are a few which may be added, and I will confine my remarks to them under the heading "technique".

1. Objects of submucous resection of the nasal septum. (a) To facilitate nasal breathing. (b) To facilitate drainage. (c) To facilitate a combination of the above. If these facts are borne in mind it will not be necessary to do a complete or nearly complete removal of all the parts, thus lessening the chances for bad results.

2. Special points of danger. (a) The immediate neighborhood of the lower lateral and septal cartilages. (b) High up along the line of junction of the septal cartilage and the perpendicular plate of the ethmoid. This is not an extremely firm union, due to the fact that the bony plate recedes from before-backward.

3. The swivel knife. If the blade is dull, it causes too much of a drag, which is unnecessary trauma. If the blade is too sharp, the knife not being under the best of control, especially if pushed from before-backward-upward and forward-downward, septal cartilage may be removed almost to the under surface of the integument. If the blade sticks, an effort to free it may cause a pulling down of the cartilage.

4. Rocking with forceps. Grasping the cartilage too high and giving a sudden wrench to one side or the other may displace the cartilage. The forceps should be completely rotated to avoid this accident.

5. Excessively high and too posterior initial incisions, causing a drag during healing.

6. Hematomata.

7. Abscesses. Dead spaces between the mucous membrane flaps must be avoided. Manifestly, in the presence of numerous perforations, few hematomata or abscesses form. This is not a plea for multiple perforations. If either hematomata or abscess supervene, it is wise to tell the patient or some relative the possibility of a depression in the dorsum of the nose following incising the hematoma or abscess.

8. Inherent excessive scar formation—a rare condition—almost keloid in hardness, causing a downward drag in and behind the primary incision. I have seen one case of this kind.

9. In every submucous operation, the normalcy of the proximating parts of the lower lateral cartilages and intervening septal cartilage must be preserved. This is absolute. If in doubt, look into any corrected deformity of the nasal dorsum and you will see the deformity still persists *inside;* in other words, the lower lateral cartilages are still in an abnormal position.

Treatment: In one instance I performed a rib transplant operation for a saddleback nose. The graft "took" but, unfortunately, the graft was too long and a decided bowing occurred. The patient was presented before this Section. Later, the patient was sent to the hospital, 13 months after the operation, and under local anesthesia, the graft was removed. This was an arduous task. It was found that the graft was firmly adherent to the left nasal bone and required both chiseling and forcible rocking to dislodge it. It was not attached to the frontal bone. The graft was removed, held in moist gauze, shortened, and replaced in actual contact with the frontal bone. The ends of the graft, after being shortened and freshened at both ends, appeared as fresh and "juicy", if I may use the term, as when first removed originally. A good cosmetic result was obtained. Bone grafting is successful. However, cartilage is so much easier obtained, so much more resistant to infection, and can be stored in a neutral area for future use if necessary, that today cartilage is used as a graft more frequently than bone.

Retentive apparatus: I have used most all forms, but my choice is a nose-guard made of No. 16 mesh copper screening, lined with cotton and both held in place with flexible collodion. The use of collodion and cotton alone is dangerous. To my knowledge, one case suffered from a pressure necrosis and caused an ugly scar. I saw this case for after-treatment.

As to operating on children, I have done a considerable number over a period of nine years. I reported on 50 cases and now I have the records of over 100, and expect to have something to say about them later.

Dr. Bowers spoke of children with an obstruction anteriorly. I have been treating this as a case of double septum anteriorly; it is not that, for it is traumatic. I make the usual incision remove half of the tissue in the septal cartilage, undermine the opposite side, and make that fit in where the original cartilage was before the injury. For instance, on the left side, take off the left wing anteriorly, and make the right wing substitute for the original cartilage.

Dr. J. I. Klepper: I was interested in Dr. Carter's paper of the evening and what he said about the columella. As I understand him, he does not think the columella plays an important part. He raised a most important point. An injury to the columella lowers the tip of the nose and therefore the end part of the bridge.

Dr. Bowers' remark about an anterior deviation, or we may say farther, a complete dislocation, is a problem to be solved. I remember a case at the Manhattan Eye, Ear, Nose and Throat Hospital, presented by Dr. W. A woman had about 15 hemorrhages and two transfusions; what other causes may have been there, she presented on examination a complete dislocated septum, from which the epistaxis took place; a problem to be dealt with and not in the class of usual operations of the septum. It seems to me the columella in adding support to the tip of the nose plays a most important role. (Illustration on the board.)

In the ordinary operation we, as Dr. Carter said, depend on the anterior part of the quadrilateral cartilage for support.

The top portion of the quadrilateral cartilage, if entirely preserved where it meets the columna cartilages, does act in conjunction with the columella as a support of the apex and, therefore, indirectly the bridge of the nose. The columnar cartilages must not be injured in any way. They are practically never dislocated enough not to be pulled back when the lower three-fourths of the dislocated quadrilateral cartilage is removed.

Dr. Carter: I wish to thank those who have taken part in the discussion for bringing up some very interesting points.

Referring to the support of the bridge by the septum, as brought out by Dr. Hurd: Of course when the septum is deflected it does not support anything higher than can reach itself. The reference made to the support of the arch by the anterior edge of the septum is assuming that it is straight. If the anterior edge of the septum is in a vertical position it is very important that it should be preserved.

As to the point brought out by Dr. Bowers in regard to anterior cases, where the vestibule is involved: We must make every effort to straighten up the

anterior portion of the septum without removing it, for if you do remove it there will be depression of the edge near the tip. If you have to secure free breathing space you may have to resect that part of the septum, and if you can cut it back in such a way as to support the tip, so much the better; if not, you will have to do a bone transplantation later. I am glad Dr. Bowers brought out that point, for it is very difficult to decide what to do with these cases. Even when I have put in a dorsal transplant, I sometimes have to put in a transplant between the columnar cartilages to help hold it up.

The paring of the columnar cartilages I have never found to do any harm. Where they are dislocated I have been accustomed to pare off the edges of the cartilage, where it can be pushed to one side and shows a white line; I pare that off and sew it up. If I feel that the tip of the nose needs further support, I cut out some of the redundant tissue and run a suture through and pull them together, where the columnar cartilages have been filling up the entrance to the nose.

I am glad to note that Dr. White backs up my position in regard to the swivel knife. It is impossible to use this knife without causing much traumatism on the septum and pulling it out of position, because when you have the mucous membrane dissected up there is very little holding up the edge of the septum between the lateral cartilages; when that is pulled out, you will have a deformity as sure as fate.

One of the prominent members of this Section told me that while abroad he went to a certain clinic and the man there did a submucous operation, going at it in a very determined way, he pulled out the whole septum from between the lateral cartilages, but went ahead with the operation. When the operation on the nose was finished, the surgeon chiseled off a piece of the man's tibia and stuck it in the patient's nose and with great eclat said: "I always prepare the tibia beforehand in case such an accident should occur." Such a man ought not to be doing the submucous operation.

Dr. White spoke of the danger of wrenching the septum, and notes that you do not have to do that in using my forceps; this is the great advantage in using this instrument. It is very important not to have traction on the septum in this operation.

Dr. Klepper spoke of the columnar cartilage. I have never observed any injury to the nose from conservative paring of these if they are causing obstruction.

Replying to the questions as to whether I ever use a chisel: I sometimes do when there is a bony spur near the floor, but I have discontinued using a chisel on the anterior spine save for the purpose of paring it. The anterior spine in its entirety should never be removed. I have seen that done, chiseled off smooth, but it was a mistake. My submucous chisel cuts in the center, the blade being protected on each side, and I recommend the use of this instrument when it is necessary to use a chisel. The punch forceps will not cut through bone, but if you punch it very hard and slightly rock the instrument it will cut out only the piece that it punches.

I don't think the removal of the bony septum is apt to cause deformity; the removal of the cartilage sometimes does. The *bony septum* is far back, and after its developmental force has been expended, as in the adult, the bony arch does not need its assistance as it is self-supporting.

THE PHILADELPHIA LARYNGOLOGICAL SOCIETY.

Regular Meeting, November 6, 1928.

Tumors of the Tonsil; Benign and Malignant. Dr. Louis S. Dunn.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION CONTINUED FROM DEC., 1928, LARYNGOSCOPE.

DR. WIEDER: With reference to Dr. Hunter's case, the question naturally arises, was it a mixed tumor? They are rather common in the palatal region and most mixed tumors have portions of the growth that are myxomatous in appearance, but more thorough examination of the growth reveals the typical cellular areas of the mixed tumors.

DR. BABBITT: While I did not hear Dr. Dunn's paper, I have had a very interesting case, hitherto unreported. This man was in the Lankenau Hospital first, later in the University Hospital. His case was diagnosed by biopsy as sarcoma involving the faucial tonsil, lingual tonsil area and surrounding tissue. Under the direction of Dr. Pancoast, radium capsule was implanted and cross-fire radium treatment given for two or three days. This man suffered as exquisite pain as in the ache of a tooth in the treatment, which I shall never forget. The sarcoma disappeared entirely from the throat, became a firm mass in the neck, was skillfully dissected and removed by Dr. Deaver, but shortly afterward general metastasis occurred and the man died.

DR. COHEN: It is all very well when a patient walks into the office, who reports blood spitting and respiratory obstruction, odynphagia, salivation, etc., but I think we should be on the alert for earlier symptoms. In an adult, particularly 40 years or over, a male who has a throaty voice, hard cervical glands, with intermittent pains referred to the angle of the jaw, neck or ear, we should investigate and search for malignancy. It was my custom to classify the symptoms into three stages and those mentioned are in the first class, and it is in that class of patients that we can hope for some success. For the cachectic, anemic patient, with respiratory obstruction and odynphagia, well, we know what to expect.

DR. DUNN, in closing: I read this paper again this evening because I was not given full time at the Allentown meeting. I should like to say a word about biopsy. As I have stated in my paper that biopsy should never be performed and if it must be performed, because of inability to make a diagnosis, care should be taken to use the cautery instead of the cold scalpel. When we use the scalpel we find that the case conflagrates very rapidly. Those of us who had experience in general surgery will recall that when they saw a large everted cervix, which was suspicious of malignancy, and when the scalpel was used for a biopsy and returned later, let us say for a period of a week, we have found a fulminating growth almost inoperable. At least that has been my experience. May I cite a case that came to me with what I diagnosed later as lymphosarcoma? The mother stated that the child had difficulty in swallowing. She consulted a physician, who had punctured the right tonsil, which was large and uniformly swollen. Nothing but blood was recovered as a result of the puncture. The mother stated that the growth progressed very rapidly after that puncture and when I saw it the child had a lymphosarcoma of the tonsil and the glands of his neck were involved. I conclude, therefore, that if the mass is large or small, as the case may be, something has to be done in order to remove the obstructing mass. If you can remove the mass, why take a biopsy? Remove it in toto. If, however, you think it cannot be removed without running considerable risk, then resort to X-ray as I have stated in my paper under the chapter of treatment. I therefore see no use in biopsy.

An Unusual Case of Lateral Sinus Thrombosis. Dr. George E. Johnson.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. BUTLER: Dr. Johnson's paper is too valuable a paper to let go without discussion. Occasionally an infection extends directly to the bulb of the jugular without mastoid involvement and only a transient otitis media. A dehiscence

in the bone between the tympanum and bulb favors such an infection. Probably this took place in Dr. Johnson's case.

DR. BABBITT: I shall be glad to speak a few words about the case. I feel very grateful to Dr. Johnson for painting this case so clearly. He was careful and a very great help and very scientific in the handling of his part.

There were certain things about this patient that were very interesting. For three or four weeks the temperature had been jumping up and down in a very septic way, rather typical of lateral sinus thrombosis, but there were no chills, no swelling in the neck nor soreness about the ear. About 24 hours before the operation, the leukocyte count jumped very high and I wonder if by any possibility the spinal puncture had anything to do with this? The lateral sinus was very peculiar, fibrous and pallid, with a little, clear secretion. While operating we scarcely felt sure we were in the lateral sinus until it had been dissected far back toward the torcular.

Now, with this ear showing so little trouble, with the other conditions all clearing up so rapidly, why did the child die? This was peculiarly distressing, because the patient seemed so well after the operation. All we can say is that probably things had been, by metastasis, incubating somewhere, developed later and carried him away.

DR. WIEDER: About two years ago, in collaboration with Dr. Bates, I reported before this Society a case of primary jugular bulb thrombosis in an adult. He had had otitis media three weeks before. Then he developed a swelling of the neck and tonsillitis.

Owing to his continually high fever, etc., which appeared too severe for a simple tonsillitis, despite lack of mastoid symptoms, his mastoid was nevertheless opened. Finding no disease of the mastoid, the lateral sinus was opened and found thrombosed. The jugular vein was tied and after a stormy convalescence, with five metastatic abscesses, the patient recovered, with a somewhat stiffened knee as the only residue.

DR. HUNTER: Dr. Johnson is to be complimented for the careful thought he has given this case. I would like to ask about one point. I note that the spinal fluid pressure test was made with the patient under an anesthetic. I would like to know the experience of physicians present, as to the effect of anesthesia on the spinal fluid pressure. Recently I saw a case with Dr. George Wood in which we took pressure under gas anesthesia. It was 830 m.m. (water). The patient got well. It was not a case of lateral thrombosis. An extradural abscess had been evacuated at operation. It occurred to us that the patient was not entirely under anesthesia.

DR. DINTENFASS: In connection with Dr. Johnson's paper on "Lateral Sinus Thrombosis", three points may be emphasized. The first is the apparent well-being of the patients with this condition. Second, the tendency to meningeal involvement. Third, the value of the Tobey test. In Philadelphia, this test has never been popular. Recently we have had several cases in which the diagnosis was doubtful and was only made through the medium of the Tobey test. Compression of the sound jugular vein produced a decided increase in the cerebrospinal pressure as compared with the diseased side. We believe that this test should be used in every instance of suspected sinus thrombosis.

DR. COATES: I would like to congratulate Dr. Johnson on his report on this case and, furthermore, to praise the method by which the diagnosis was reached. The indications of lateral sinus thrombosis were certainly far from typical and it is of great interest to note that the Tobey-Ayer test proved to be the deciding factor. I know of no cases that are harder to diagnose than sinus thrombosis when symptoms are atypical. Two winters ago I had two such cases, in neither of whom was sinus thrombosis even suspected until the sinus itself was laid bare at operation. In each case free pus in the sinus was found, though previous to operation there had been only the signs and symptoms of mild mastoiditis.

DR. JOHNSON, in closing: In reference to the test under anesthesia, I have inquired what effect anesthesia has on this test. Several neurologists have informed me that it has little or no effect as to increasing the pressure. In Dr. Babcock's new book, he states that on deep expiration the manometer will show an increase of 10 to 15 m.m. I think it advisable to do a Tobey test in all such cases. In this case it was the outstanding factor in making diagnoses.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

November 19, 1928.

Dr. Herschel Ezell, Chairman, presided.

Acute Sinusitis Following Swimming. Dr. F. E. Hasty.

D. G., age 16 years, gave a history of good health before this attack of sinus trouble. Went swimming in a river and three days later began complaining of left frontal headache, which rapidly increased in severity, and within 24 hours the left eye was practically closed by swelling, principally in the upper lid. The conjunctiva was somewhat congested but was not swollen. The swelling increased and extended over the anterior portion of the left side of the head. On the seventh day after the onset of the trouble an incision was made in the left superorbital ridge and considerable pus was evacuated and a perforation in the outer corner of the orbital space was located. The floor of the frontal sinus was removed and a large opening was made into the nose. The ethmoid and antrum, as had been indicated by X-ray, were badly diseased. A drainage tube was placed through the nose to the frontal sinus. There was an area of increased swelling near the anterior fontanel and another a little anteriorly and above the left ear. The scalp between these two points was elevated by a collection of pus. This was evacuated when a stab wound was made in the lowest point of the swelling and a tube was placed for drainage. The superorbital incision was closed by interrupted sutures and the recovery was rather uneventful, except for a collection of pus over the maxillary region and a possible involvement of the left parotid gland. A stab wound was made in the cheek and some pus was evacuated, the swelling subsided with the use of an ice cap. The drainage tube in the temporal region was removed and the wound closed; the swelling mentioned before in the region of the anterior fontanel did not subside, but became very definitely walled off and when opened several days after the operation considerable pus was found and the bone was eroded. This wound continued to drain a slight amount of pus and serum but as the patient was gaining in weight and strength and seemed to be progressing nicely, I felt it inadvisable to disturb the wound. The wound healed after about three months and now, at the end of the fourth month, the patient seems to be entirely well. To my mind, the one lesson to be learned from this experience is that in spite of our teaching up to recent years, to deal with osteomyelitis of the skull with radical treatment, conservative treatment is perhaps the safer method, and it is perhaps well to remember that if Nature cannot wall off the infection the patient will not recover anyway.

I would have been perfectly willing to operate on this patient some three or four days earlier if I had had the permission of the parents to do so. Now, as I look back over the case, I am not sure that it was not well that I did not operate earlier.

DISCUSSION.

Dr. E. B. Cayce: When you have infection where bone is involved and where the swelling is outward, you can wait and let Nature build up resistance, and then don't attempt to do too much when the operation is done.

Dr. M. M. Cullom: The river is a safer place to swim than a creek, as all creeks are infected now, but they are safer than a swimming pool.

W. W. Wilkerson, Jr., Secretary-Treasurer.

BOOK REVIEWS.

Ears and the Man. Studies in Social Work for the Deafened. By Annetta W. Peck, Estelle E. Samuelson and Ann Lehman, with an introduction by Wendell C. Phillips, M.D. Philadelphia: F. A. Davis Co., 1926.

Every individual interested in the various problems of deafness, in adults or children, may gain much valuable information from this little book. It is written in lay language by deaf social workers who have had tremendous experience in these problems. For this very reason subjective and objective opinions are given and thus the so-often overlooked point of view of the patient himself is given much importance.

The introduction, by Dr. Wendell C. Phillips, lends added value to the book.

M. F.

The Tonsils and Adenoids and Their Diseases: Including the Part They Play in Systemic Diseases. By Irwin Moore, M.B., C.M. (Edin.), Late Honorary Surgeon to the London Throat Hospital for Diseases of the Throat, Nose and Ear, also to the Hospital for Diseases of the Throat, London. London: William Heinemann (Medical Books), Ltd., 1928. Price 21 shillings net.

This volume is a condensation of the many papers which the author has written on the subject, together with additional data obtained from other books, society meetings and his own experience.

Because of the clear manner in which the material is presented the book forms an excellent reference to the tonsil literature.

The chapter on Bacteriology and Pathology will be of use to anyone wishing accurate statistics. The relationship of the tonsils and adenoids to the general diseases is well and clearly brought out.

Moore gives a good working table of indications and contra-indications for tonsillectomy which will help the general practitioner and medical student, as well as the specialist, in determining which tonsils should be enucleated and when it should be done.

In his description of anesthetics for tonsillectomy, Moore mentions the injection of a few drops of 4 per cent cocain mixed with adrenalin, for the production of local anesthesia. In America, where local anesthesia is used to a much greater extent than elsewhere in tonsillectomy, the injection of cocain, in any strength, is generally outlawed and it is rather a surprise to find Moore even mentioning its use. Moore also mentions in detail the use of general anesthesia in adults. This is much more commonly used in England than elsewhere.

Various methods of technique of tonsillectomy are offered and many valuable hints in the management of difficult cases are given. The important statement that the general medical practitioner can enucleate tonsils but is stuck when the surgical necessity of arresting hemorrhage arises, cannot be given too much emphasis. Oto-rhino-laryngology has lost prestige because of just such poor handling of cases by the unqualified.

The part of the book devoted to hemorrhage, its causes and arrest, can only be very highly recommended to all, specialist as well as student. Moore very rightly puts heavy emphasis on the use of surgical arrest of surgical hemorrhage and the specialty, as a whole, should pay more attention to this rather than to the use of various medicaments locally and generally applied.

There is a chapter on nonsurgical methods of shrinking and removing tonsils which is a concise account of what can be done in those cases where surgery is contra-indicated.

The closing chapters are devoted to the study of adenoids and lingual tonsils.

M. F.